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SOUTH PACIFIC COMMISSION

quarterly BULLETIN

VOL. 5. NO. 4 OCTOBER, 1955

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Principal Commission Publications: Pacific Reading Supplement

PUBLISHED BY THE SOUTH PACIFIC COMMISSION, NOUMEA, NEW CALEDONIA

THE SOUTH PACIFIC COMMISSION

The South Pacific Commission is an advisory and consultative body set up by the six Governments responsible for the administration of Island Territories in the South Pacific region. Its purpose is to recommend to the member Governments means for promoting the well-being of the people of these territories. It is concerned with social, economic and health matters. Its headquarters are at Noumea, New Caledonia.

The Commission was established by an Agreement between the Governments of Australia, France, the Netherlands, New Zealand, the United Kingdom and the United States of America, signed at Canberra on the 6th February, 1947, and finally ratified on the 29th July, 1948. Until the 7th November, 1951, the area of the Commission's activities comprised territories lying generally south of the equator from and including Netherlands New Guinea in the west to the French Establishments in Oceania and Pitcairn in the east. On 7th November, 1951, an additional Agreement was signed at Commission headquarters in Noumea on behalf of the six participating Governments, extending the scope of the Commission to include Guam and the Trust Territory of the Pacific Islands under United States administration.

The Commission consists of twelve Commissioners, two from each Government, and from 1948 until 1953 met twice a year. It now normally holds one Session each year. There are two auxiliary bodies, the Research Council and the South Pacific Conference.

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The Research Council, which meets annually, held its first meeting in May, 1949. Members are appointed by the Commission, and are selected for their special knowledge of the functions with which the Commission is concerned, and the problems of the territories in these fields. The chief function of the Research Council is to advise the Commission what investigations are necessary. Arrangements to carry out those that are approved are the responsibility of the Secretary-General and other principal officers.

The South Pacific Conference, which meets at intervals not exceeding three years, consists of delegates from the local inhabitants of the territories, who may be accompanied by advisers. The first Conference was held in Suva in April, 1950, and was attended by delegates from fifteen territories and from the Kingdom of Tonga. The second Conference was held at Commission headquarters in April, 1953.

The Commission's staff includes six principal officers, as follows: Secretary-General, Dr. Ralph C. Bedell; Deputy Chairman of the Research Council, Dr. E. M. Ojala; Deputy Secretary-General, Mr. John Ryan; Executive Officer for Health, Dr. E. Massal; Executive Officer for Economic Development, Dr. A. H. J. Kroon; Executive Officer for Social Development, Mr. H. E. Maude, O.B.E. The Deputy Chairman and the three Executive Officers are ex officio members of the Research Council. The principal officers are supported by a small technical and administrative staff.

Further particulars of the Commission's activities may be obtained from the Secretary-General, Noumea, New Caledonia.

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SPC QUARTERLY BULLETIN

THE SPC QUARTERLY BULLETIN, first published in January, 1951, features articles on selected activities in the Commission's three main fields of operation: economic development, health and social development. Articles are also contributed by specialists working in these and related fields, in the territories within the Commission area.

THE BULLETIN is given selective world distribution to people and institutions in widely differing fields sharing a common interest in the purposes and work of the Commission. It is published in two editions, English and French.

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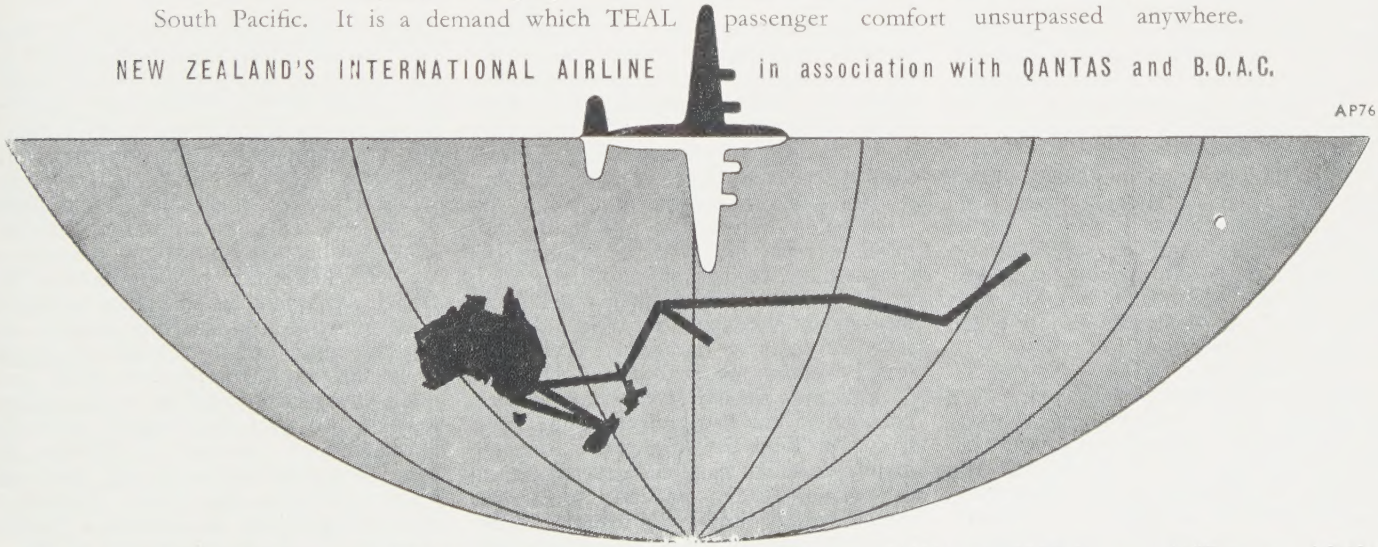


SYDNEY — MELBOURNE — AUCKLAND — CHRISTCHURCH — FIJI — SAMOA — COOK IS. — TAHITI — TONGA

Delegates who attended the Second South Pacific Conference held at Commission headquarters, Noumea, in April, 1953.

Third South Pacific Conference

Next April, delegates from eighteen Pacific island territories will assemble at Suva for the Third South Pacific Conference. This article explains the origin and purposes of the Conference, which is an auxiliary body of the South Pacific Commission.

By I. K. MacGREGOR

IN April, 1956, representatives of people living on the many islands scattered across the Pacific Ocean will assemble in Suva to attend the Third South Pacific Conference. The Fiji Government's invitation to hold the conference in that territory was accepted by the Commission at its session last October. The Teachers' Training College at Nasinu, five miles from Suva, where the First South Pacific Conference met in 1950, has again been placed at the Commission's disposal for the Third Conference.

The Second Conference was held at the Commission's headquarters in Noumea in 1953.

Although only two conferences have been held, delegates attending them from the non-self-governing territories in the Commission area, and from the Kingdom of Tonga, have shown how effectively they can thus contribute both to their own social and economic progress and to that of the entire region.

The Conference, which meets at intervals not exceeding three years, was constituted by the Agreement Establishing the South Pacific Commission concluded between the Commission's six member governments at the South Seas Conference held in Canberra in 1947. It is a body auxiliary to the Commission, having advisory powers. As such it may discuss those matters which fall within the competence of the Commission, and make recommendations concerning them to the Commission.

At first sight the Conference's powers may appear somewhat circumscribed, but it should be borne in mind that the relationship between it and the Commission is parallel to that obtaining between the Commission and its participating governments, to whom the Commission is a consultative and advisory body. Whatever may be the constitutional niceties involved, the Conference in operation has demonstrated its responsibility and has proved to be as it were, a kind of regional marae—a forum in which can be freely expressed the needs, the hopes, and indeed, the doubts felt by the Pacific Islander today.

The responsibility of the advice tendered to the Commission by the first and second conferences is reflected in the extent to which their recommendations have been translated into positive action by the Commission and its member governments. Much of the work completed or proceeding under Commission projects in such diverse fields of activity as mosquito-borne diseases, health education, nutrition, population studies, literature promotion, professional and technical education, industrial development, fisheries, the coconut industry, commercial relations, co-operatives and the marketing of island products owes its inspiration to discussions held at these two conferences. With the experience of previous conferences behind them, the delegates and their advisers attending the Third Conference may be expected to provide a further stimulus to the Commission's efforts.

Miss B. A. McLachlan (on left) of the Department of Education, Australian New Guinea, with three women delegates to the Second South Pacific Conference—(left to right) Miss Tani Sisa (Papua), Mme. Terorotua (French Oceania) and Pa Ariki (Cook Islands).

The Conference is a means of associating representatives of the peoples of island territories with the Commission's work. In territories where there are representative legislative bodies, delegates to the Conference are nominated by these bodies. Where these institutions do not yet exist, delegates are nominated by the administering authorities. In addition, the interests and activities of official and non-official institutions directly concerned with these territories are recognized by the provision made in the Conference's rules of procedure for the admission of their representatives as observers at sessions of the Conference. Thus religious mission organizations, certain of the United Nations specialized agencies, the Pacific Science Board of the United States National Research Council, the French Institute of Oceania, the Royal Institute for the Tropics, Amsterdam, and the Australian National University are among the institutions which have been represented at previous conferences. They have also been invited to send representatives to the Third Conference.

The Commission and the Conference are indebted to these and to other organizations for their continuing practical interest in the work of the Commission and its auxiliary bodies. Their observers at previous conferences have often been invited as experts in particular fields of activity, to participate in the discussion of questions related to these fields on which the delegates have felt the need for specialist advice. The contributions made at the Second Conference by Mr. F. R. Bray, the I.L.O. observer, to the discussion on marketing problems, and by Mr. Lynford Keyes, the W.H.O. observer, to that on health education, provided examples of how experience of conditions outside the Pacific region can be applied in suggesting possible solutions, acceptable to the people themselves, of problems arising within it.

Agenda For Third Conference

Main subjects on the agenda for the Third Conference were suggested by the delegates attending the Second Conference. They reveal the Pacific islander's lively sense of enquiry into questions associated with economic progress and better health. At the same time the selection of subjects evidences a certain canniness of attitude towards the fundamental adjustments which the islander can see must eventually be made to his social order as an inevitable consequence of economic change.

At the Third Conference about sixty representatives of the Pacific Island including their advisers, will discuss such matters as economic education and the importance of sound economic development to the welfare and progress of the people; aspects of industrial and commercial progress and development, including the progress of indigenous industries and the establishment of new ones, problems of modernizing and mechanizing industrial and commercial enterprises, and the processing of agricultural and marine products; farming systems, including the place of livestock in the South Pacific; co-operative societies and credit unions as a means of promoting the welfare of the South Pacific people; and infant and maternal welfare.

Discussions held on the above topics will no doubt stimulate the interest of delegates in, and promote their understanding of, new methods which, if applied by their peoples, can contribute to the improvement of their material conditions.

Anxious though he is to assimilate into his own pattern of existence those new arts which will enable him to achieve more rapid progress, the islander of today is not so oblivious of the enduring traditions which have in the past sustained his people, whether they be Melanesian, Micronesian or Polynesian, as to wish to exchange them lightly for all the techniques and trappings of the industrial age. This being so, he considers that the assimilation process might be achieved without too violent a break with his traditions. Manifestations of the islander's desire to preserve, perhaps in a modified form, those customs which have evolved over centuries of existence in a particular type of environment are provided by the inclusion on the Conference agenda of the following topics: The role of custom in the social development or social retardment of the populations of the South Pacific; means for adapting custom to modern living conditions and the improvement of social conditions of the people by modifying custom; and indigenous arts, customs and cultures, their encouragement and retention where useful.

In comparison with the changes that have taken place in island customs within living memory, the process of their adjustment in earlier days to meet changing conditions was so gradual as to give the impression of a more or less static society.

The discussion at the Third Conference of the role of custom promises to be rewarding in that it will enable those delegates from more developed territories, whose societies are no longer regulated solely by custom, to pass on their experiences to those in whose communities custom is an all-pervading element in the determination of the social and economic relationships of their individual members. It may be that methods will be suggested whereby the impact of economic change might be cushioned in such a way as to ensure that the transformation of customary societies into societies in which other values are acceptable along with custom, will be accomplished smoothly.

The subjects for discussion at the Conference indicate that the peoples themselves perceive the need for some social change as a condition precedent to their greater welfare. They seek a deeper understanding of the factors influencing such change in order that they might evolve adaptations of existing customs most suited to meet new conditions. In this way those elements of their cultures which are held precious may be preserved while custom, intelligently modified, may become an instrument of progress rather than a factor which inhibits it.

At the first two conferences all the proceedings were conducted formally in plenary session. A general committee responsible for the adherence to timetable and the preparation of draft resolutions was elected at each conference. In the light of experience gained at the two conferences, delegates felt that the discussions would be more effectively conducted if subjects included in the agenda were considered by committees before being handled in plenary session. They recommended that at the opening of the Third Conference the general committee should propose two standing committees and that each subject on the agenda should be allotted to one or other of these committees, which would prepare draft resolutions for consideration in plenary session. If this procedure is adopted at the Third Conference a greater opportunity will be afforded for the informal discussion of each agenda item in committee.

Te Moananui-a-Kiwa, the great sea of Kiwa—the ocean we know today as the Pacific—offers as clear a challenge to those who now dwell on its islands as ever it did to their forebears. In their swift-sailing double canoes these hardy navigators of former days matched their skill against unknown perils which they endured in the course of successive migratory voyages to new lands. The elements into which their descendants venture today may be different, but the virtues which they have inherited of courage and resourcefulness in the face of the unfamiliar have ample scope for employment in solving the complex problems of existence in the modern world.

The Conference, which brings together people from the remote and lovely islands of the Pacific Ocean in a way never previously possible for them, provides the only means of ensuring the joint consideration of regional problems by those most directly affected by them. The Conference is also an earnest of the intentions of each of the Commission's member governments to promote the well-being of the inhabitants of its non-self-governing territories. The Commission ensures that the advice tendered by the Conference is fully considered by those ultimately responsible for giving effect to it. The two institutions may be likened to the double canoe of the ancient Polynesians, as together they provide the peoples of the region with a means of charting new seas of endeavour.

Monsieur R. Lassalle-Séré, the Chairman of the Second Conference, in his opening address suggested to delegates that the greatest benefit would come from their contacts and conversations with each other, and the knowledge they would thus gain of the outside world which would otherwise remain unknown to many.

He added that at a time when curtains were being lowered, isolating whole continents from the rest of the world, when suspicion and hatred borne of this segregation and the ignorance it engendered, were darkening the international horizon, it was no small comfort to see gathered in a search for better knowledge and understanding, representatives of peoples so widely separated and so different, one from the other.

Fisheries Training Course Planned by Commission

THE South Pacific Commission has decided, subject to the conclusion of a satisfactory agreement with F.A.O., to sponsor late next year a Fisheries Training Course designed chiefly to provide the various groups of territories in the South Pacific with trained people to assist in fisheries development, either as officers in local fisheries services or leaders in private fishing ventures.

The training course would be a joint activity of the Commission and of the Food and Agriculture Organization of the United Nations. It is expected that the F.A.O. contributions would be substantial, covering part of the transportation and subsistence costs of trainees as well as the purchase of some of the equipment and teaching material that will be needed.

Mr. H. van Pel, the Commission's Fisheries Officer, would share the task of organizing and directing the course with an Associate Director from F.A.O. Accommodation and facilities are available at Commission headquarters.

As envisaged at present, the programme would include a maximum of practical training in a variety of subjects such as net making and mending, boat handling and maintenance, fish preservation, fishing methods new to the region, and elementary navigation.

Other subjects involving a background of theoretical studies, supported where possible by practical demonstrations, include general knowledge of marine resources, boat building, basic information on currents, tides, etc., fish-farming, and the conservation of fisheries resources.

The maximum number of trainees would be twenty-five. The course would be expected to last approximately fourteen weeks. Its level is foreseen as post-primary, since at present, fisheries in the Pacific chiefly need trained personnel for the implementation of specialist recommendations in the territories.

Dr. F. Bugnicourt, Director of the *Institut Français d'Océanie* at Noumea, has mentioned the possibility of assisting such a course by the loan of the Institute's research vessel, "Orsom III", for practical training purposes. He also considers that members of the Institute's oceanographic staff could give lectures which might prove of considerable value for the trainees. Finally, the reference collection of fishes maintained by the oceanographic laboratory of this institution would undoubtedly form a very valuable teaching aid.

The organization of a fisheries training course figured among the recommendations formulated by the Fisheries Conference, arranged by the South Pacific Commission in Noumea, in 1952. During discussions at the Research Council's Seventh Meeting last July, Dr. Cecil Miles, the F.A.O. observer, expressed the opinion that such a course would certainly be effective in promoting development of fisheries in the area.

Fisheries Officer In Micronesia

Mr. H. van Pel, the Commission's Fisheries Officer, is at present investigating fisheries in Guam and the Trust Territory of the Pacific Islands. Among the problems he will have to deal with are those associated with the development of sea fisheries in Guam to meet the local demand, and with overfishing in the Ponape Lagoon.

While at Honolulu on his way to Guam, Mr. van Pel widened contacts already established with the Pacific Oceanic Fishery Investigation, the U.S. Fish and Wildlife Service and other authorities working on fisheries and related problems.

After completing his investigation in Guam and the T.T.P.I., Mr. van Pel will attend the Sixth Meeting of the Indo-Pacific Fisheries Council in Tokyo early in October. He will return to Commission headquarters via Manila, where he hopes to procure some selected *Tilapia* breeding stock for further work on fish farming.

This is the seventh territorial survey undertaken by Mr. van Pel in the South Pacific since he took up his duties with the Commission in July last year.

The larvae . . .

47,000- Dollar Grant For Rhinoceros Beetle Campaign

Latest most important development in the Commission's campaign against the rhinoceros beetle in the Pacific is the generous grant just made by the Rockefeller Foundation of up to $47,000 to cover an expanded research programme.

By C. P. HOYT*

THE South Pacific Commission will shortly extend its rhinoceros beetle research programme to include active field research on diseases of the coconut rhinoceros beetle (*Oryctes rhinoceros*). The Commission already has two entomologists in the field, searching for insect predators and parasites of this coconut beetle and studying beetle ecology and possible control measures.

The addition of a specialist in diseases of insects and their application for the control of this pest has been made possible by a grant to the Commission from the Rockefeller Foundation of up to $47,000 (£stg.16,786) over a three-year period.

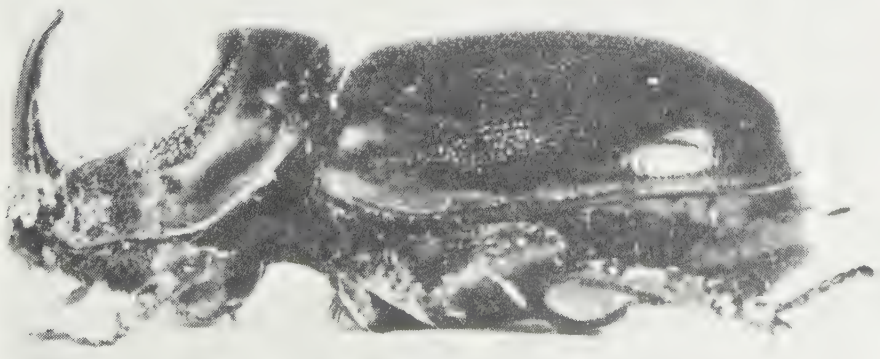
The development of knowledge and techniques in the fields of bacteriology and mycology as applied to the study of diseases of insects has only recently advanced to the stage where this type of biological control may be considered practical. There has been much speculation on the possibilities of using various bacteria, viruses, fungi and other micro-organisms which have been observed to attack insects. However, attempts to make practical use of these agents have met with indifferent success, largely due to a lack of knowledge of the organisms involved and of techniques for handling them.

The micro-organisms which cause diseases in insects belong to the same general groups as those which cause diseases in other animals. However, in general insects are not susceptible to the specific agents causing diseases in other animals, and most of the things which cause fatal diseases in insects are completely harmless to other forms of life. Thus, if a disease is discovered that readily attacks the rhinoceros beetle, there will be little danger that it can harm livestock, people or plants.

A few disease-causing agents have been found which attack the rhinoceros beetle and its relatives. Probably the most common is a fungus, *Metarrihizium anisopliae* (Metsch.), which kills fair numbers of rhinoceros beetle larvae under certain conditions. Various bac-

* Plant and Animal Quarantine Officer, South Pacific Commission.

. . . *and the beetle* (Oryctes rhinoceros)



The illustration above shows almost full-grown, healthy rhinoceros larvae (actual size). It is at this stage of growth that the attacks of Metarrhizium fungus are easiest to detect. LEFT: Lateral view (enlarged) of the adult beetle, which, when full grown, is from 1½ inches to 2 inches long.

teria have been found associated with the beetle larvae or grubs. Most of these do not appear to cause any fatal disease, though they may weaken the grub so that it may not survive at some later stage.

Bacillus popilliae, a species of bacteria which has been used with success to control the Japanese beetle (*Popillia japonica*), has been tried experimentally on rhinoceros-beetle larvae. This species has the ability to form spores which are quite resistant to external conditions and which are able to infect hosts on contact. The larvae or grubs of the Japanese beetle live in the soil of lawns and feed on the grass roots. If spores of this bacterium are dusted over the lawn they work into the soil and remain there for long periods. Invading beetle grubs serve as hosts for the bacteria which, upon killing the grub, produce more spores. The limited experiments so far carried out with *Bacillus popilliae* spores and rhinoceros beetle grubs were not very successful. This, of course, could have been due to the particular species of bacteria used, or to faulty techniques of the experimenter.

Viruses are extremely minute forms of life which at times seem to be extremely close to the borderline between the living and non-living. As they are too small to be observed with an ordinary microscope, their study is extremely difficult. In general, their detection depends on the observation of the disease symptoms in the host animal or plant.

The knowledge of virus diseases in insects and the techniques for handling and propagating them is a very recent development. A virus disease of the larvae of the Japanese beetle has been discovered and investigations are being carried out on possibilities for its large-scale utilization in control efforts. A virus disease of an alfalfa (lucerne) eating caterpillar was discovered fairly recently. Spread in a water solution sprayed from an aircraft flying over alfalfa fields, this virus disease was able to control the outbreaks of the caterpillar over wide areas, at very low cost to the farmer.

Comparatively New Field of Investigation

The fungus, bacteria and viruses mentioned here are but a few of several hundreds of known disease-causing agents which use insects as hosts. As this field of investigation is comparatively new, it is safe to estimate that there must exist thousands of other species of bacteria, fungi and micro-organisms which are as yet unknown. In addition to these possibilities there is the great number of viruses, the knowledge of which is even more obscure and undeveloped.

With this vast amount of material to draw from, the chances of finding a suitable disease-producing agent to assist in the control of the coconut rhinoceros beetle are such as to warrant a most careful search. The Rockefeller grant will enable this to be undertaken. This greatly respected Foundation is once again devoting invaluable attention to practical problems faced by the people of the Pacific.

Dr. Harold St. John (left), photographed with his assistant, Mr. Benjamin Stone, at the foot of a pandanus tree growing on the University of Hawaii campus.

Three-Year Pandanus Study

By ART SILVERMAN

DR. HAROLD ST. JOHN, Professor of Botany at the University of Hawaii, has received a $12,000 grant from the National Science Foundation in Washington, D.C., for a study of the Pandanus of the Pacific. The grant will cover a three-year period and pay for the services of Benjamin C. Stone, a graduate assistant, who will spend much of his time in the Pacific islands collecting specimens of pandanus.

Dr. St. John says that there are 400 known species of Pandanus, but that no one had taken the time to make an exhaustive study of the plant. He feels it is likely that many new species will be discovered.

"Certain species with delicious edible fruit grow on some of the Marshall Islands," says Dr. St. John. "There are also spineless varieties on some islands that are greatly superior to anything we have in Hawaii for weaving. These are just a few of the enticing by-paths that we see opening up in this study."

Pandanus is of interest as a scientific problem, and the attempt will be made to collect and study the various species as fully as possible. However, it will not be physically or financially possible to visit every tropical island, some of which have scores of kinds of pandanus.

"A three-year period is a long one," says Dr. St. John, "and will allow much exploration and study, but pandanus grows on all the tropical Pacific islands and there are tens of thousands of these islands."

Since the expected results will be of scientific value, and of practical value in horticulture, fruit production, and the art of weaving or plaiting, co-operation is invited. Any traveller or settler can readily help by sending in to Professor St. John, at the University of Hawaii, specimens of each interesting kind of pandanus with a record of its origin, nature of the tree, its native name and uses.

For the female tree, a photograph is desired, but the minimum specimen would be one leaf and three or four dry sections of the fruiting head, and a statement of the size and shape of this head. The male trees are separate, and from these a leaf or flower cluster is desired.

Co-operation with this scientific research by sending of such specimens is invited.

Chocolate From Fiji-Grown Cocoa

AN informal chocolate tasting "ceremony" was carried out in the office of the Director of Agriculture at Suva on 14th September. The occasion was the arrival from London of eleven samples of chocolate made from Fiji-grown cocoa.

This is the second batch of samples to be received by the Agricultural Department from the Cadbury firm, who agreed recently to manufacture chocolate samples from Fiji beans. With each manufacture Cadburys make a report on the flavour qualities of the beans and this information, together with investigations in Fiji into crop yield, assist the Agricultural Department in the selection of the most commercially-suitable strains for propagation.

Co-operatives Make Progess In Papua and New Guinea

As a way of promoting economic development within village communities, native co-operatives are proving particularly valuable in that they do so without harmfully disrupting traditional village life and customs. That they are prospering in Papua and New Guinea is shown in this review of the latest annual report on Native Co-operative Societies in that territory.

Students at the Regional Co-operative School near Rabaul, conducted by the Co-operatives Section of the Department of Native Affairs. Here, co-operative storemen and store managers are taught basic business principles and bookkeeping. Those showing special ability can enrol for advanced training as Native Co-operative Inspectors at a similar school in Port Moresby.

THE annual report on native co-operatives throughout the Territory shows that during the year April, 1954, to March, 1955, total co-operative turnover was £962,603, or 55 per cent. over the previous year. This includes production and sale of copra, cocoa, rice, trochus shell and other produce, and the turnover of consumer goods through co-operative stores.

Percentage increases in co-operative turnover during the past six years are as follows:

YEAR	*TOTAL TURNOVER (£ Aust.)*	*% INCREASE*
1950	62,302	
1951	111,750	79.37%
1952	189,550	69.62%
1953	394,639	108.20%
1954	620,443	57.22%
1955	962,603	55.15%

There are now 198 Co-operative Societies throughout the territory and eleven Native Societies Associations, the latter functioning as the general purchasing and marketing agencies for the individual co-operative groups. During the past year 16 new Co-operatives and 2 new Associations were formed; 7 Societies and 1 Association in Manus, a similar number in the Central District of Papua, and 2 new Societies in New Britain.

A significant aspect of co-operative growth is that the annual turnover is now more than three times the capital investment, which was obtained through purchase of original shares by co-operative members. Where there has been a big increase in the volume of copra and other produce being purchased and marketed by the co-operatives, it has been necessary to use accumulated profits to finance the extended volume, and the matter of providing additional capital to maintain and, where necessary, extend trading is now under consideration.

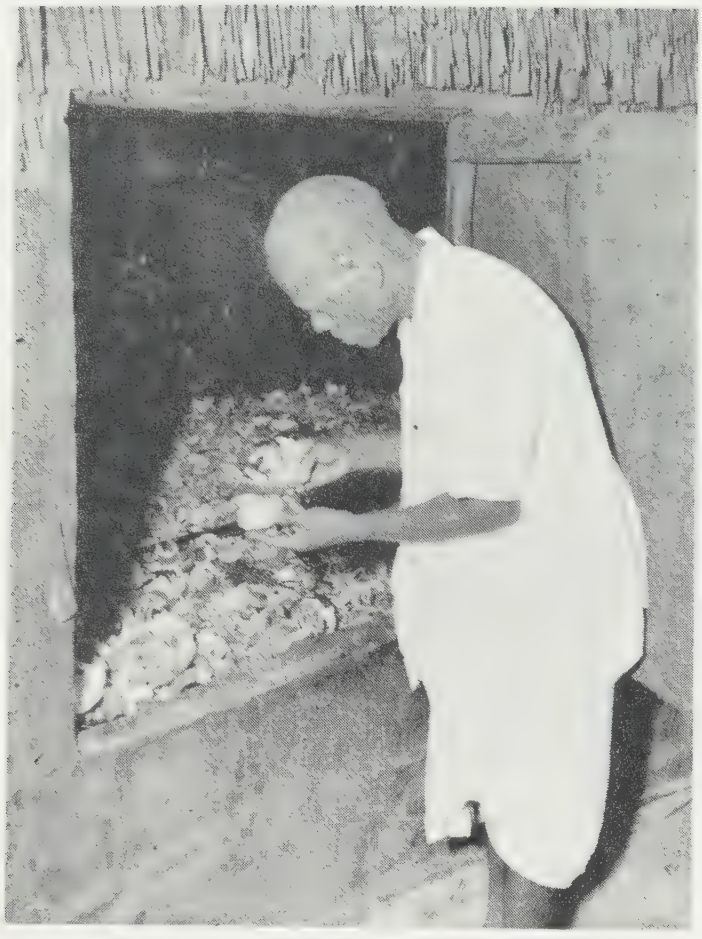
Until last year, the Co-operative Section was engaged mainly on extending the co-operative movement, but during the past twelve months efforts were concentrated on consolidating existing organisations, following the normal practice of business concerns after initial development. This policy has resulted in building up increased financial reserves and thus improving the security of the co-operatives. Other aspects of consolidation were the placing of greater personal responsibility on the native staff of the individual groups, and withdrawal of supervision from the older societies, coupled with the transfer of Administration native co-operative staff to the payrolls of the Associations.

Regular routine visits of inspection were made by officers of the Co-operative Section in most areas, and close contact was maintained with the native population engaged in co-operative activities. During the year 450 audits were made, and in some areas other audits were carried out by salaried native staff of the Associations.

Co-operative Education

During the past year 78 natives were trained for co-operative work by means of the special courses conducted at the Rabaul and Port Moresby schools run by the Co-operative Section. Of these 20 completed the advanced course for inspectors, and the others were trained as store managers and storemen.

Expansion of educational work will follow the completion of a new co-operative school being erected at Port Moresby at a cost of approximately £11,500. It will accommodate 60 residential students. A portion of the cost will be met by various co-operative organisations. Assistance has also been provided through the Commonwealth Bank from its Rural Credits Development Fund by a first grant of £3,500, and consideration may be given to a second grant this year. It is intended that the financial cost of running the



A member of a native co-operative society checking copra during drying. In Papua and New Guinea, native interest in copra production has increased sharply over the past few years and, in addition to regularly harvesting nuts from mature groves, many communities are now clearing new land to extend their acreage. During the year 1954-55 native copra production totalled 19,000 tons, worth £1,300,000 to the growers and representing approximately 20% of the total output of the Territory.

school will be borne by the co-operatives. In this way the organisations will be creating, at their own expense, a continuous flow of trained co-operative staff.

In the Port Moresby region the Poreporena and Hododae Co-operative Society serving the general Hanuabada area continues to handle a large volume of consumer goods through its retail shops, and functions very satisfactorily without supervision from the Co-operative Section. Two co-operative building groups are engaged in construction work under contract, and there is a constant demand for their services by the Administration and private enterprise. The I.E.S. (Institute of Economic Services) provides a wholesale importing channel for office equipment and consumer goods which are unobtainable locally, and with the Central District Native Societies' Association serves as a training ground for senior native co-operative staff.

Coastal Ship Purchased

The Abau co-operatives, which have been hampered by lack of sufficient sea transport, have bought a 45-foot coastal ship, which arrived in the territory this month. In the past it has been necessary at times to halt copra production, due to lack of transport and the danger of copra rotting while awaiting shipment.

In the Kairuku District native production has increased from £9,000 to £24,000 during the past year, and, while it is not claimed that this is solely due to the co-operative movement, the activities of the societies were undoubtedly a contributing factor. On rice production last year the Mekeo people produced 80 tons, and, despite some damage by floods this year, it is anticipated that the output will be higher for the current season.

The Kukipi area in the Gulf District has provided the first instance of co-operative profits being used for a major village improvement. This is the installation of a water reticulation system by the Iokea Society, which has purchased over a mile of 4" piping to run water from a reservoir formed by damming a small creek. The native community is entirely responsible for initiating and executing this project, and ownership of the scheme is being vested not in the Co-operative Society but in the village as a social unit. The project is indicative that the people do not regard their Society as solely a means of personal economic emancipation.

At Ihu, also in the Gulf District, local co-operative societies now own and operate two tractors for the transport of copra along the hard sand beaches which link the villages with the coastal shipping points. All produce can now be brought to the loading points without undue difficulty.

Previous transport problems affecting co-operative societies centred on Kar Kar Island in the Madang District have been overcome by the purchase of a vessel, and this is now making regular collections from native growers.

Considerable Progress In Manus

Co-operatives have shown considerable progress in the Manus District, where there are now nine Societies and one Association, which effectively cover the major potential of the region. The strength of Manus co-operatives lies very largely in the collection and sale of trochus shell rather than copra.

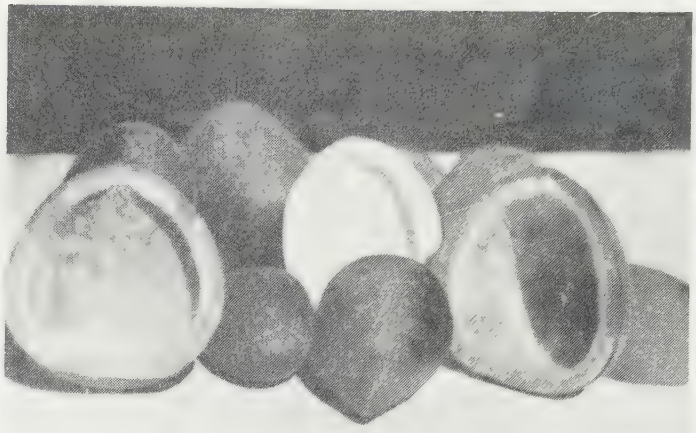
In the Gazelle Peninsula, Bougainville and New Ireland, co-operatives have been affected by the Copra Marketing Board's action in tightening up on copra grading, and this has caused some setback in production. The degree of recovery varies between the three areas, but it is particularly noticeable in New Ireland that the Societies are solidly entrenched in village life, and with one exception have recovered from the temporary setback. This matter of copra grading was the most serious material problem during the year, although some areas were not affected due to their consistent production of high-quality copra.

Although turnover figures for the past year show a 55 per cent. increase this rate of progress is not as high as in previous years. This is very largely due to the fact that established areas are reaching saturation point as far as co-operative extension is concerned. Also, while production is not up to maximum existing potential, it is reaching a level where the native producer's additional cash requirements are balanced against his unwillingness to make further efforts. This balance is not permanent, but change in favour of additional income will be slow.

In general the co-operative societies at the present time present a strong contrast with the struggling organisations which marked the inception of the movement. Societies have become a unit of measurable importance in the economy of the territory, and a major factor in the lives of the native people.

The Manufacture of Copra In The Pacific Islands

An exhaustive two-year coconut and copra study of the Pacific was completed last year for the Commission by Mr. W. V. D. Pieris, formerly Acting Director of the Ceylon Coconut Research Institute. His observations and recommendations in respect of the manufacture of copra have now been published in SPC Technical Paper No. 82, THE MANUFACTURE OF COPRA IN THE PACIFIC ISLANDS. *This report is reviewed below*



This illustration from Mr. Pieris's report is of ball copra—perfect copra from whole nuts dried over a slow fire. It is made traditionally in India and Ceylon by placing whole coconuts on racks built over open kitchen fireplaces.

by W. L. CONROY*

COPRA producers, governments, and technical workers throughout the Pacific will welcome Mr. Pieris's report, which is undoubtedly the most comprehensive study yet made of copra production techniques in the region. The report is well illustrated with numerous photographs and diagrams which add considerably to its value and interest.

Copra is clearly the cornerstone of the commercial economy of the numerous territories lying within the tropical part of the Pacific, and yet, with a few notable exceptions, the product under the general description of "South Seas" has had an unenviable reputation for poor quality on European markets. It was logical for the South Pacific Commission to take an interest in copra quality, methods of manufacture, and marketing procedures, and in May 1952 Mr. Pieris, formerly Acting Director of the Ceylon Coconut Research Institute, was engaged to make a two-year study of these matters and allied questions of coconut agronomy.

The report is divided into three major sections, the first of which provides general background information and a discussion of methods of extraction of the coconut kernel. The author describes in detail the husking tool used in Ceylon and considers it a superior implement to any in use in the Pacific. He expresses surprise that husking is so rarely used as a preliminary to kernel extraction and is critical of more commonly used methods finding frequent contamination with dirt and other foreign matter.

Part two of the report gives a detailed discussion of consumers' (millers') requirements, methods of collection and transportation and producers' problems in this field, uses of coconut oil and copra by-products, and methods of handling and processing. The author concludes that the aim of producers should be copra of sufficiently good quality to be used in edible oil production. Such oil has a wide range of uses, while soap oil made from the poorer, discoloured, and smoked types of copra is restricted to a single usage, and thus a poorer market. A strong case is made out for the very careful grading of export copra where it is to be handled by bulk shipping methods. The best quality product suffers a discount while the poorer qualities get an unearned premium when bulk shipments are made up from widely varying parcels. A warning is issued against the practice of burning sulphur in copra driers, as an undesirable rubbery flavour has been found to be caused by contamination of edible oil with free sulphur.

Wide Variety of Driers

Part three of the report, in which copra driers and drying methods are discussed, will undoubtedly arouse most interest among producers. Mr. Pieris found an almost bewildering variety of driers in use, many of them of makeshift construction, and incorporating numerous designs. Driers varied widely in efficiency.

Sun-drying practice showed every variation, from the most primitive methods where nuts are simply split open and left to dry on the ground, to the use of various types of drying platforms, the most efficient being those with a sliding roof, or sliding drying platforms under a fixed roof, which afford complete protection from rain. Mr. Pieris tends to write off sun-drying because of the long period involved in curing—eight to ten days, as against five days for Ceylon drying, and 30 to 40 hours for hot-air drying.

This may not, however, seem a valid reason for discarding the practice to many smallholders in the Pacific, at least for some years to come, and his discussion of the subject provides an excellent basis for an overall improvement in technique.

In discussing fuel driers of the open hearth type, the author gives detailed attention to the smoke drier, which is a common feature of the industry in parts of the Pacific. He is generally critical of the types of drier used, the principal faults being poor ventilation, the use of mixed fuel, and inadequate provision for circulation of air through the drying platform. Through his discussion of this type of drier runs the implicit conclusion that heavily-smoked copra is undesirable because of its limited market.

The classical type of open hearth drier is the standard Ceylon model, and the report provides a fully detailed description. The author found that Ceylon type driers in use in the Pacific tended to diverge from the standard type, the variations being in his opinion unsatisfactory. The most important of these defective variations are: location of the fire at ground-level rather than in a sunken fire chamber, absence of vents in fire chamber and poor ventilation of drying chamber, and the use of a continuous rather than a divided fire chamber.

A detailed description is given of the type of concrete barbecue used in Ceylon in conjunction with the Ceylon drier for preparation and initial sun-drying. These could be used to advantage in the Pacific, since they ensure added cleanliness, and the preliminary drying gives a better quality copra. An important aspect of Ceylon-drying technique, which was being omitted in those areas visited by the author, is the cooling of the drying copra between each firing.

Detailed attention is given to the structure and use of hot-air driers, and

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Two further illustrations from Mr. Pieris's report. Left: Well-made sun-drying platforms with moveable corrugated iron covers on Hervey Island, Cook Group. The building behind houses a "Chula" forced-draught hot-air drier. Right: The drying chamber, effluent pipe and chimney of a cheap, well-constructed German-type smallholder's hot-air drier at Ataliklikum Bay, Gazelle Peninsula, New Britain.

the author expresses general approval of these, to be found mainly in New Guinea, Western Samoa, Cook Islands and the Trust Territory of the Pacific. Smallholder usage of these driers is particularly well developed in the Trust Territory of New Guinea. Mr. Pieris considered that a drier at Rarotonga in the Cook Islands was the most efficient of the smallholder's type hot-air driers seen during his tour, and makes the interesting observation that if certain features of the New Guinea type drier were included in the Rarotonga model, the result should be a drier of exceptional efficiency.

Of particular interest in this section of the report are the detailed descriptions of the Seychelles drier, the Pearson's Patent Copra Kiln, and the large hot-air drier used by the New Zealand Reparation Estates in Western Samoa. Detailed description and assessment of the "Chula" forced draught and natural draught mechanical hot-air driers are also provided. The discussion of hot-air driers concludes the general matter of the report.

The more important of Mr. Pieris's conclusions given in his *Resume and Recommendations* are as follows:

1. Price incentives and future stability of markets are needed to ensure production of good quality copra;
2. the Pacific region as a whole should aim at the production of high-grade copra of edible oil quality, and all copra contaminated with soot should be penalised;
3. four types of drier are to be considered as suitable for the region—the Standard Ceylon type, the New Guinea hot-air drier, the Seychelles drier and the patent hot-air "Chula", with the Pearson's Patent recommended as worthy of trial;
4. the practice of cutting out kernels in the field on bare ground is condemned—such work should be done on clean concrete or rendered cement floors, and kernels should be dried as soon as they are cut out. Concrete barbecues after the Ceylon model should be built close to all driers and drier verandahs, buildings housing driers, and cooling, airing, sorting and bagging rooms should have concrete floors;
5. standardization of copra quality throughout the region is desirable, and an attempt should be made to introduce a simple, uniform, inter-territorial grading system, which would be greatly assisted by standardization of methods of manufacture.

It would be most unusual if a report such as this on a subject so vital to many Pacific territories did not produce a certain amount of controversy, and this reviewer would take issue with Mr. Pieris on the following points:

1. The general application of the Standard Ceylon Drier to the region. The use of this drier requires far more careful control than the usual types of hot-air drier, and the recommendation would appear to fail to take into account the temperament and incentives of both the average estate worker and average smallholder in the Pacific. The relatively high labour requirement of this type of drier is a factor of considerable importance to planters. It is also to be noted that figures for the economics of Ceylon-type drying from Papua quoted in the report are unlikely to be related to the present-day cost of erecting such driers as permanent structures, using suitably resistant building materials. Grass and palm-leaf thatch, where they are cheaply available, and salvaged galvanized iron, wire-mesh and similar materials, with bush timber have played a large part in the erection of such driers in the post-war period.
2. The condemnation of the use of cut kernels, which is common in association with hot-air drying in the Pacific, and the recommendation that only half nuts in the shell should be used, whatever the type of drier. It is conceded that cutting of kernels can be deleterious if exaggerated to the point where very small pieces result, but this is not general practice, and it is considered that cut kernels are much better adapted to the quick-drying conditions of hot-air driers, and are much more easily managed in the driers.

In regard to the question of cut kernels versus half nuts in the shell, the capacity of the drier in relation to output and cost of erection is also of the utmost importance, especially now that more permanent types of piping, flues and furnaces are being installed at a higher initial cost, and there is no doubt that a greater output can be achieved with cut kernels. Experienced workers with hot-air driers would not agree with Mr. Pieris's statement that "the resultant copra (from cut kernels) is always dirty and discoloured in varying degrees".

It is also to be noted that the use of cut kernels combined with hot-air driers would, from experience, appear to be superior to the Ceylon method in heavy rainfall zones where sun-drying is impossible when harvesting, and rainwet kernel must inevitably be handled. The Ceylon drier technique of doubling the shell lines during the first firing in such cases, with its attendant danger of case-hardening, is obviated.

The above are, however, to be re-

(continued on page 18)

Pacific Subsistence Crops . .

CASSAVA

The cultivation of cassava, its dietary value, and common ways of cooking it are discussed in this article, the seventh of a series on subsistence food plants of the South Pacific. A note is also included on several other less widely-grown edible tuber-bearing plants.

BY EMILE MASSAL and JACQUES BARRAU

Executive Officer for Health, South Pacific Commission — Subsistence Agriculture Officer

Young cassava seedlings. New Caledonia.

CASSAVA is assuming an increasingly-important place in the subsistence economy of the South Pacific. The nutritionist and tropical agriculturist, whose main concern is to improve the protein content of the various diets, cannot fail to deplore this tendency, for cassava is, amongst the staple foods, the most unbalanced in respect of protein content. These factors are the justification of this study, which will be supplemented by information on other tuber-bearing food plants of secondary importance, either long-established or only recently introduced in the area.

Origin of Cassava

Cassava originated in tropical America, where from Mexico to Peru it was grown as a food plant before the arrival of Europeans. In the sixteenth century Portuguese seafarers brought it to Africa, whence it spread to Madagascar, Java and the Asiatic continent. It is found today all over the tropic zone.

Cassava is grown in most South Pacific territories. It seems to have been introduced into certain Polynesian islands during the first half of the last century. From there it spread to the other island groups. Around 1852, a missionary named Collins brought it from Samoa (or Tonga) to New Caledonia, and two years later M. de Bovis, Captain of the sloop *Le Phoque*, introduced into New Caledonia a large number of seedlings collected at Tahiti.

The plant belongs to the *Euphorbiaceae* family. It is a shrub measuring from 6 to 8 feet in height, with soft, brittle stems with a high pith content. The leaves, which have long stalks, are deeply indented into 5 to 7 segments. The root is dark in colour, thick, fleshy and starchy. It is divided into a varying number of tubers, which grow to a length of 3 feet or more. Two species are generally recognized:

Manihot esculenta Crantz., (*Jatropha Manihot* Linn., *Manihot utilissima* Pohl.), commonly known as "bitter cassava" because of the presence of a cyanogenetic glucoside, manihotoxin, toxic and bitter, found in the outer layers of the tuber, and

Manihot dulcis Pax., (*Jatropha dulcis* Gmel., *Manihot palmata* Muel.) or "sweet cassava", which contains only small quantities of manihotoxin.

Some consider the distinction drawn between sweet and bitter species is out-of-date, as the bitterness, connected with the presence of manihotoxin, depends essentially on ecological conditions and agricultural techniques.

The variable content of manihotoxin does not, however, constitute a valid botanical distinction. In fact, there are two separate varieties differing in appearance: *M. esculenta*, a hardy shrub with dark green leaves and whose stems often tend to be red or reddish, and *M. dulcis*, which is more fragile, and whose leaves and stems are generally light green. The fruits of the two species are also characteristic. The capsules of *M. esculenta* bear six small wings, whereas those of *M. dulcis* have none. Many botanists question the validity of the latter character of differentiation and consider *M. dulcis* as a variety of *M. esculenta*, resulting from empirical selections made in the course of cultivation.

Polynesian arrowroot. Aitutaki, Cook Islands.

Cassava normally grows all over the tropic zone. Its development and yield are decidedly influenced by climate. Permanent humidity increases growth of the green parts to the detriment of the roots. The plant has a fairly strong resistance to drought, but should this be severe or prolonged, there is a resultant decrease in yield. In the South Pacific cassava is mainly grown in areas with less than 100 inches annual rainfall—New Caledonia, the south and west sides of Viti Levu (Fiji), the southern part of Papua, etc.

Cassava will grow in a wide range of soils, even poor or very poor, provided they do not hold stagnant water and are not liable to flooding. It prefers light alluvial soils, even of a sandy nature, but will if necessary tolerate more compact types provided the earth has been previously loosened by digging. The poor fertility of many soils in the South Pacific islands greatly restricts the yield of the traditional tuber-bearing plants, and partly explains the development of cassava cultivation.

Propagation is carried out from cuttings, those taken from the base of the stems giving the best results. They can be planted at any time of the year, but the beginning of the rainy period seems

TOP: Preparing "pia flour" in the Cook Islands from Polynesian arrowroot by scraping the tuber. CENTRE: Washing the grated roots. BOTTOM: Drying the starch in the sun.

to be the most favourable. Harvesting takes place, depending on varieties, from 7 to 18 months after planting, the best time corresponding to the cessation of growth. Pacific islanders sometimes plant several cuttings in the same mound of earth and gather the tubers as needed, without pulling up the plants. Planting often takes place during the yam harvest. Cassava is then left to grow without attention during the first two years of the fallow period.

Yield varies considerably according to variety, climate, the nature of the soil and methods of cultivation. In the semi-foraging conditions prevailing in native gardens of the South Pacific, it cannot usually be expected to exceed from 1 to 4 tons per acre, i.e., from 1 to 4,000,000 calories. It should be mentioned, however, that in good conditions of soil and cultivation, yields of from 8 to 16 tons have been obtained.

The tuber-roots of cassava cannot be preserved fresh, since they ferment after a few hours. They can be kept in slices dried in the sun, or in the form of flour produced from the pulp. This method of conservation has no practical value for the local subsistence economy because of continuity of production and "underground" storage.

In the South Pacific today, cassava constitutes a subsistence crop only in fairly dry areas, or in areas where other activities prevent the islanders from devoting time to more complicated and demanding crops. At Aitutaki (Cook Islands), for instance, cassava has become a very important part of the diet; it is taking the place of taro, since only a limited area of ground can be utilized at present for growing this traditional staple food. Generally speaking, cassava is still no more than a stand-by or supplementary food. However, the fact that it readily adapts itself to very varied climates, is not difficult as far as soils are concerned, is easy to grow, and gives a very satisfactory yield, explains the expansion in its cultivation and promises further development in this direction.

The tubers and leaves of cassava are both used for human consumption. Analyses carried out on different varieties and in a number of areas indicate that the average composition of fresh cassava per hundred grams is as follows:

Water	67	*gm.*
Calories	130	
Total carbohydrates	30	*gm.*
Cellulose (fibre)	1.5	*gm.*
Protein	1.2	*gm.*
Fat	0.3	*gm.*
Ash	1.2	*gm*
Calcium	0.13	*gm.*
Phosphorus	0.10	*gm.*
Iron	0.8	*mg.*
Vitamin A	0	
Vitamin B_1 (Thiamin)	0.040	*mg.*
Riboflavin	0.075	*mg.*
Vitamin C (ascorbic acid)	25	*mg.*
Niacin	0.6	*mg.*

From the energy point of view, fresh cassava is equivalent to a third of its weight in rice and a half of its weight in bread. However, the low proportion of fat calories, the protein deficiency and the poor biological value of the proteins present make it an unbalanced food. A high proportion of the fresh cassava, assessed at 25% of gross weight, is wasted in preparation; 100 grams of fresh cassava thus possess an actual energy value of from 90 to 95 calories. Cassava starch hydrolyses easily, is readily digested and convertible to dextrin. This property is utilized in dietetics (tapioca).

Calcium, phosphorus and iron contents are low, but the $\frac{\text{Calcium}}{\text{Phosphorus}}$ ratio (approximately 1.5) is balanced.

The low vitamin content should be noted; this is normal in a storage plant. Fat-soluble vitamins A and D are absent. Fresh cassava does not seem likely to be conducive to beri-beri, the $\frac{\text{Vitamin B}^1}{\text{Calories (non-fat)}}$ ratio varying from .3 to 2.85. The amount of riboflavin and niacin is low, but adequate. Vitamin C (ascorbic acid) is present in abundance in fresh cassava.

Before the last war an attempt was made, notably in Indo-China and Indonesia, to produce varieties of cassava with a higher protein content, through selection and hybridization. However, it has not been possible to obtain hybrids popular with consumers. The analytic study of the protein content in cassava reveals the limited value of such selections; Professor Bigwood has, in fact, demonstrated that the limiting factor was methionine, an essential amino acid.

The tubers are generally eaten peeled and boiled in water, broiled on the embers or baked in the native oven. The latter two methods are preferable since mineral salts, vitamins B_1 and C, riboflavin and niacin are soluble in water; cooking in

Queensland arrowroot, Canna edulis.

Seedlings of cordyline terminalis. Cook Islands.

Tuber root and leaves.

boiling water removes them almost entirely.

Sometimes in the New Hebrides the islanders grate fresh cassava and cook it in the oven wrapped in green leaves. Flour or semolina made from dried sections of tuber are not used in Pacific territories. Starch is extracted from fresh cassava tubers by grating, threshing, washing and draining; this is dried in the oven and produces a sort of tapioca which is fairly granular. After the starch had been extracted, the early Tahitians used to dry the pulp, thus producing a tasty food. In the Padaido Island Group, Biak area of Netherlands New Guinea, this pulp is formed into balls of 2 to 2½ inches in diameter and dried over a fire for about a week. These are grated afresh and mixed with coconut milk and water to form a kind of soup.

The sweet varieties are most sought after. The manihotoxin can be removed from the bitter varieties by soaking, washing, and peeling, but the water also removes other soluble elements (vitamins and mineral salts), thus reducing the nutritive value.

The composition of cassava leaves is roughly as follows:

	PER 100 GM. OF DRIED LEAVES
Protein	30 *gm.*
	PER 100 GM. OF FRESH LEAVES
Iron	8 *mg.*
Carotene	6 *mg.*
Ascorbic acid	320 *mg.*
Niacin	2.5 *mg.*
Thiamin	0.270 *mg.*

Their nutritive value is far from negligible. In Africa, they are used with fats, mucilage and condiments (peppers) in preparing a sauce which accompanies the tubers.

It should be stressed that cassava is an unbalanced food. When used almost exclusively in the diet of a young child it may lead to a marked deficiency disease, kwashiorkor, nowadays attributed to three factors:

(a) a determining cause: protein deficiency,
(b) a limiting factor: methionine (the shortage of this amino acid in cassava has already been shown), and
(c) a deficiency of vitamin B_{12} (a necessary growth factor).

Diets based on cassava must necessarily be supplemented. This can be done fairly easily by the addition of coconut milk, fish and green leaves.

The starch and tapioca industry, particularly in Madagascar and Africa, has encouraged the selection of varieties rich in starch, at the expense of other nutritive elements. Such attempts are admittedly justified, but application of the results obtained—the introduction, for instance, of these new varieties in the Pacific—seems hardly desirable in the present state of local conditions.

Replacement of the traditional tubers by fairly recently introduced cassava is neither usual nor universal in the area. The various causes leading to the cultivation and use of cassava have come into play only in a few areas, where they have nevertheless created situations which are worthy of immediate attention. Only a precise study of the nutrition of the peoples concerned will enable consideration of the food value of cassava in the South Pacific.

Polynesian Arrowroot

In the coastal areas of certain Pacific islands, Polynesian arrowroot *Tacca leontopetaloides,* (L.) O.K. (*Tacca pinnatifida,* Forster) is often found growing in the wild state.

This plant belongs to the Taccaceae family, closely related to the yams, and originated in South-East Asia. It would appear to have been introduced in very early times. It is sometimes cultivated, and occasionally is used as a food. The tubers contain a bitter element which disappears with washing and cooking.

In the New Hebrides, the fresh tubers are grated and cooked in the native oven wrapped in green leaves. The arrowroot extracted from *Tacca* was once commonly sold abroad, but is now limited to the New Hebrides. The product was known as "pia flour" or "Tahiti arrowroot". The fresh tubers are peeled and grated. The pulp thus obtained is threshed and washed over a sieve. The starch runs off in the water and is collected in a nearby receptacle. After a short time, the liquid which rises to the surface is pumped off and the starch dried in the sun. Properly dried, it keeps well.

In Tahiti, it is used for making "poe", a traditional food which consists of a mixture of fruit pulp (pawpaw, banana, pumpkin, etc.) and starch in varying proportions. This is flavoured with vanilla and lemon, and cooked in the native oven wrapped in green leaves; it is eaten sprinkled with coconut milk. In some islands (Cook Group), cassava takes the place of arrowroot for preparing a starch used in making "poke".

The true arrowroot, *Maranta arundinacea* L., which originated in tropical America, has been introduced into South Pacific territories but is hardly ever used. The same is true of *Canna edulis* Ker., also known as Queensland arrowroot.

Other Tuber-Bearing Plants

Other tuber-bearing plants were formerly used as foods by South Pacific islanders. They now hold very little place in the diet.

Cordyline terminalis (L.) Kunth., (*Dracena fruticosa* (L.) Merr.) is a Liliacea, probably originating in Indo-Malaya, which was introduced in early times into the Pacific islands and grown both for food and ornamental purposes. The leaves were used as a packing material or for producing textile fibres.

In Polynesia, the plant is known as "ti". The roots—which can weigh as much as 80 lb. in old trees—were eaten

Tubers of "magnagna" (Pueraria). New Caledonia.

after being cooked for several days. In the Cook Islands, *Cordyline terminalis* was sometimes cooked in the native oven with "kape" (*Alocasia macrorhyza*) tubers. The *Alocasia* tubers were placed at the bottom and the *Cordyline terminalis* roots above. The cooking time required was from 2 to 3 days. The sweet juice produced by *Cordyline terminalis* improved the flavour of *Alocasia*. After cooking, the tuber will keep well for more than a week. *Cordyline terminalis* roots contain approximately 20% of sucrose. The juices extracted from the cooked roots were used to make a fermented liqueur which was distilled to produce a potent spirit known as "o-kolehao" in Hawaii. During the reign of Pomare II (1803-1821), Hawaiians taught the Tahitians how to make this drink, as follows:

> Whole districts would gather together to construct what might be called a public still. This was a rudimentary installation which, nevertheless, fulfilled its purpose only too well. A large hollow stone was placed on a pile of stones with a fire underneath. A wooden cover in the form of a half-sphere was set on the hollow stone. The "Ti" root which had been previously soaked in water and was in a state of fermentation, was then placed in the hollow of the stone. The fire was lit and a hole pierced in the cover for the insertion of a long bamboo pole, water cooled, down which the alcohol ran into a gourd. When the ceremony was ready to begin, the men built a temporary hut to enclose the still, and settled down to drink the *ava*. The first alcohol to run off was the strongest, and was known as "Ao". It was collected and given to the chief; the remainder was consumed by the whole gathering. These ceremonies sometimes lasted several days, the alcohol being consumed as produced. . . . (Ellis Williams, Polynesian Researches. London, 1829, in *Tahiti aux Temps Anciens*, Teuira Henry, Paris, 1951, p. 46.)

Another plant whose tubers were formerly eaten fairly widely is a legume whose botanical identity is controversial. It would appear to be a "kudzu", probably of *Pueraria lobata* (Willd.) Ohwi (*P. thumbergiana*, Benth.) and often confused with *Pachyrrhizus trilobus*, D.C. This *Pueraria*, known as "yaka" in Fiji, "magnagna" in New Caledonia, originated in Asia and was probably one of the most important foraged plants in Melanesia. The tubers are still eaten occasionally. In the Pacific islands where this legume abounds it has never proved possible to harvest the seeds, although the plant flowers normally. The true *Pachyrrhizus* has been introduced into some territories. It has been observed in southern Netherlands New Guinea, imported from Indonesia.

The young tubers of *Psophocarpus tetragonolobus*, D.C., a plant which has been present from early times, at any rate in New Guinea, are also eaten by the islanders. We were, incidentally, interested to note that in the mountains of New Guinea, the tubers of a wild orchid of the genus *Habenaria* are foraged and eaten.

The natives of New Caledonia and the Loyalty Islands cultivate a sterile banana, *Musa paradisiaca* L., subsp. *sapientium* Kuntze, var. *oleracea*, Baker, for its large and edible rhizome. Since it keeps well after cooking, it was used in former times as food for journeys.

The early inhabitants of Polynesia used to eat the tubers of a fern called "Para" which is, in fact, *Marattia fraxinea*, Sm. It is still found in the high valleys of some islands.

In Tahiti, the Chinese have introduced one of their tuber-bearing plants, the arrowhead, *Sagittaria sagittaefolia*, L., an aquatic plant of the alismaceae family which is common nowadays in the marshy taro gardens of Tahiti and Moorea. The Chinese are probably responsible also for introducing to these islands the lotus *Nelumbium nelumbo* (L.) Druce, a nympheacie whose tubers are eaten by Orientals. The lotus, which is an aquatic plant like the arrowhead, has spread in some taro gardens, particularly at Moorea.

The potato, *Solanum tuberosum*, L. is grown in the dry, cool season in the more temperate regions of the South Pacific—New Caledonia and Fiji, or the Central Highlands of New Guinea. It has very little importance in the diet of the natives, who often dislike its flavour. Furthermore, it is difficult to grow because of its susceptibility to cryptogamic diseases.

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The Manufacture Of Copra In The Pacific Islands

(continued from page 14)

garded only as points of disagreement and must not be considered to detract from the general value of this report. No doubt they also have a local flavour derived from the reviewer's background of experience in Papua and New Guinea.

Mr. Pieris and the South Pacific Commission are to be congratulated on the presentation of a report which, while dealing fully with its subject, will at all times hold the reader's interest, and can undoubtedly be used as a basis for the progressive improvement of copra quality in the region.

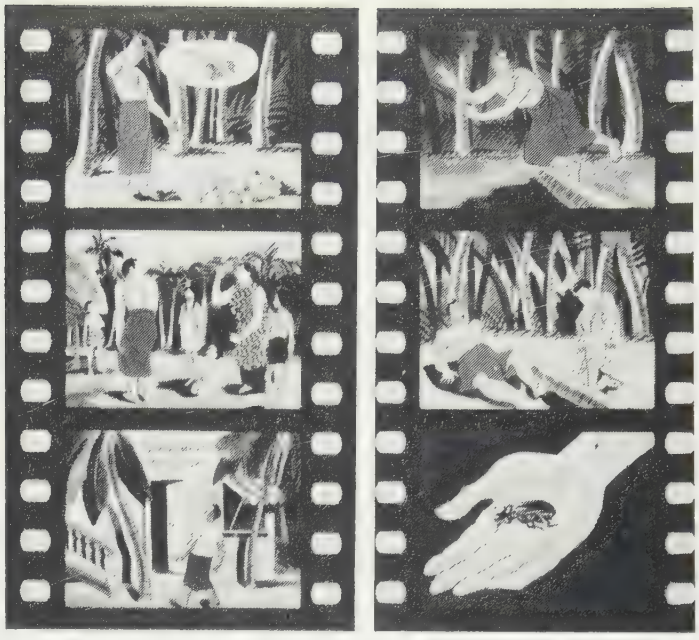
NOTE: Copies of *The Manufacture of Copra In The Pacific Islands* are obtainable from the South Pacific Commission, G.P.O. Box 5254, Sydney, Australia, price 6/- stg. post free by surface mail.

500-Ton Coaster For Tonga

A NETHERLANDS shipyard has received an order from the Government of Tonga to build a coaster of 500 tons deadweight, which will be specially equipped for the transport of copra. The vessel will also provide accommodation for the transport of 200 deck passengers. She will be provided with a diesel engine of 500 h.p., to give a speed of 10 knots.

Education By Pictures

Visual aids for extension work in health and agriculture.



Two sequences from the colour cartoon filmstrip, "Tofi and the Rhinoceros Beetle".

NINE filmstrips, three posters and three flannelgraphs for use in health and agricultural extension work in the islands have been produced under the Commission's work programme during the past year, and others are in process of production.

These achievements are the result of collaboration between the Commission's technical specialists in health and economic development matters and its Visual Aids Officer. They are complementary to the assistance now being given by the Commission to Pacific territories in their own local production of visual aids*.

It is of course seldom possible to design a filmstrip or poster of flannelgraph with a 'general South Pacific setting' which will be just right for audiences in all parts of the region. But the subjects of these Commission productions are of widespread importance in the territories; and although the pictures and manner of presentation are usually designed with one particular territory or group of territories in mind, they have been planned with an eye to keeping the cost of adaptation to a minimum, where adaptation is necessary and feasible.

Copies of the materials produced by the Commission are sent for inspection and appraisal to territorial Governments, and some to missions; and they are made available for general sale in the region at cost. As soon as filmstrips and flannelgraphs are completed, copies are available on sale. The printing of posters must normally await a territorial order for a reasonably-sized edition; in the meantime, black and white photographs of them are sent out for appraisal.

With all items issued for appraisal or sale, information is given on the construction and use of visual aids, and on the possibilities and approximate costs of adaptation of the material supplied.

So far as possible, several related teaching materials are made on one subject, for it has been found in many parts of the world that the effect of showing, for example, an isolated filmstrip on a subject, can wear off very soon, whereas a great deal can be done by a teacher or extension worker if he can draw upon a variety of related teaching aids, which may be films, filmstrips, posters, flannelgraphs or booklets, to use along with his own resources of lesson and demonstration.

Experiment and Trial

A great deal remains to be learned about the types of visual aids, and the methods of using them, best suited to the various South Pacific territorial needs. As the materials now being produced by the Commission are thus essentially experimental, the comments of the people using them in the territories will be a most important contribution to the Commission's visual aids programme.

Brief descriptions follow of the items so far produced by the Commission, or close to completion. Those already available are marked with an asterisk: copies of them may be obtained, at the prices listed, from the Visual Aids Officer, South Pacific Commission, Box 5254, G.P.O., Sydney, Australia. All prices are in sterling. The filmstrips are titled in English and French, and commentaries can be supplied in either language.

Hygiene

**Filmstrip on* SOAP: colour drawings, instructional treatment, New Caledonian setting. 38 frames. 24/-.

**Display Poster on* SOAP: a 3-colour poster, designed for reproduction by silk screen or

SOAP: The three-colour display poster (left) and a sequence from the filmstrip (right).

* See *Quarterly Bulletin*, July, 1955, p. 41.

Sequences from three colour filmstrips. Left to right: "Fight Filariasis", "Soil Erosion", and "Selection of Mother Palms".

multilith, New Caledonian setting. Black and white photocopies available on request, for inspection. Approximate costs of editions are:—

Silk Screen: size 20" x 30", 600 copies @ 2/4 each; 1,000 copies @ 2/- each.
Multilith: size 14" x 20", 500 copies @ 1/- each; 1,000 copies @ 10d. each.

**Teaching Poster on* SOAP: a colour poster designed for reproduction by silk screen or multilith. New Caledonian setting. Black and white copies, available on request, for inspection. Approximate costs of editions are:—

Silk Screen: size 20" x 30", 6 colours, 600 copies @ 3/7 ea.; 1,000 copies @ 3/2 ea.

Multilith: size 14" x 20", 4 colours, 500 copies @ 1/6 ea.; 1,000 copies @ 10d. ea.

**Flannelgraph on* SOAP: printed in black line, with colour guide and instructions for use. 4/- per copy.

Dental Health

**Filmstrip* LOOK AFTER YOUR TEETH: colour drawings, instructional treatment, Fijian setting. 37 frames. 24/-.

**Flannelgraph* CLEAN YOUR TEETH: printed in black line, with colour guide and instructions for use. 2/6 per copy.

Filmstrip CARE OF THE TEETH FOR MOTHERS AND BABIES: colour drawings, instructional treatment, Fijian setting. 30 frames. Expected to be available early in 1956, at 24/-.

Nutrition

**Filmstrip* MILK FOR BABIES: black and white drawings, instructional treatment, Micronesian setting. 44 frames. 5/-.

**Flannelgraph* BOTTLE FEEDING: printed in black line, with colour guide and instructions for use. 2/6 per copy.

Poster DIET OF PREGNANT AND LACTATING WOMEN: a combined display and teaching poster, for reproduction in approximately 5 colours. Articles of diet, etc., shown in the poster are now being amended. Black and white photocopies in unamended form available, on request, for inspection.

Filariasis

**Filmstrip* FIGHT FILARIASIS: colour drawings, instructional treatment, Samoan setting. 38 frames. 24/-.

Tuberculosis

**Display Poster* ANTI-TUBERCULOSIS: a 3-colour poster, reproduced with French text by multilith for the New Caledonian Health Service. A limited number of copies of this edition, captions in French, are available at 9d. per copy. New editions, with French or English text, can be reproduced at 1/- per copy for a 500 edition, or 9d. per copy for a 1,000 edition.

Alcoholism

A poster measuring 20" x 12" with French text reproduced in three colours at the request of the New Caledonian Health Authorities for use in their campaign against alcoholism. An edition of 1,000 copies was published in Nouméa at 7 francs CFP (10d. stg.) each.

Land Use

**Filmstrip* SOIL EROSION: colour drawings, semi-narrative treatment. Fijian setting. 34 frames. 24/-.

Rhinoceros Beetle Control

**Filmstrip* TOFI AND THE RHINOCEROS BEETLE: colour cartoon drawing, narrative treatment, Samoan setting. 40 frames. 24/-.

Coconut Cultivation

Six filmstrips on the care and cultivation of coconuts form the *Wealth from the Coconut* series, and tie in with the booklet of the same title by W. V. D. Pieris, recently published by Messrs. Ure Smith & Co. Pty. Ltd., 166 Phillip Street, Sydney, in association with the South Pacific Literature Bureau, at 2/6 per copy.

All six filmstrips are instructional in treatment, and consist of colour drawings. Some are completed; others are still in production. They are:—

*1. *Selection of Mother Palms:* Samoan setting. 26 frames. 20/-.
*2. *Selection of Seed Nuts:* Samoan setting. 17 frames. 16/-.
3. *The Coconut Nursery:* Melanesian setting. 30 frames. Expected to be available in December at 24/-.
*4. *Selection of Seedlings.* Fijian setting. 20 frames. 20/-.
5. *Preparation of Seedling Holes:* Fijian setting. 37 frames. Expected to be available in November at 24/-.
6. *Transplantation of Seedlings:* Melanesian setting. 37 frames. Expected to be available early in 1956, at 24/-.

Left: An anti-tuberculosis poster, prepared for the New Caledonia Health Service. In native villages, tuberculosis is often transmitted inside dwellings by sufferers spitting on floors where children play and eat; hence the poster's message—"Spit in the fire, and burn up tuberculosis germs".

Right: A sheet from the flannelgraph, "Bottle Feeding". Each object is cut out and used to illustrate a story outlined in the text accompanying the flannelgraph.

School Feeding—Its Contribution To Child Nutrition

By MARJORIE L. SCOTT

A summary prepared by E. Massal*

To my knowledge, in no territory of the South Pacific does there exist a school feeding programme. The matter has been discussed several times; isolated attempts have lasted only a very short time, fading out with the departure of enthusiastic initiators or disappearing gradually in the face of indifference on the part of the public authorities. This summary of the work by Marjorie L. Scott, SCHOOL FEEDING — ITS CONTRIBUTION TO CHILD NUTRITION *(published in 1954 by the F.A.O. in its series: Nutrition Studies 1954, No. 10), will, it is hoped, hold the attention of those who have often given thought to this problem. —E. Massal.*

Children eating lunch specially prepared by health experts and served daily in the dining room at the Turner Infants School, Canberra.

AS early as 1943, the United Nations Conference on Food and Agriculture stressed the importance of improving feeding of "vulnerable groups" and particularly the feeding of school children. The expression "vulnerable group" in the special sense given it by nutritionists, seems to have been used for the first time in 1936 by the League of Nations experts. Individuals in this group have relatively higher needs than others in proteins and certain other nutritional elements, and their health suffers immediately from diet deficiency.

In 1946, the permanent consultative commission of the F.A.O. had prescribed that:

> "The F.A.O. should study school feeding programmes for children, such as they are operated in different countries, from before the compulsory school age right up to adolescence; the survey should cover types of foodstuffs, organization and cost of meals, as well as their influence on the children's health. Information concerning school feeding systems which have produced good results might assist governments in establishing satisfactory programmes, particularly in countries where this undertaking is still in its early stages."

Information communicated by governments was completed by a direct survey carried out by F.A.O. nutritionists, by discussions held during the course of conferences and regional commissions, and by the results obtained from aid and development programmes, operated jointly from the United Nations International Children's Emergency Fund and the F.A.O.

The interest of governments in school feeding has increased considerably since the second world war. Existing programmes have been extended, and new ones initiated. The anticipated advantages of this health and social measure are:

Improvement of health: children who are inadequately nourished during the active period of growth and development cannot become robust adults;

improvement of the child's ability to learn: it should be noted that school feeding was introduced into the United Kingdom in 1906 in response to an educational need, for it was considered that children suffering from malnutrition could not profit to the full from public education;

nutrition education: school feeding provides a means of instilling children, and through them their parents and the community, with better feeding habits. In this respect, school meals constitute an aspect of programmes of even wider scope designed to improve the nutritional status of the whole nation:

the possibility of finding a ready market for food products with high nutritional value of which there is a surplus on the world market.

Marjorie Scott's survey, which was produced in answer to a recommendation of the standing advisory committee on nutrition, covers all aspects of the problem of school feeding. She says:

> "We hope that the present study will contribute to increasing world interest in supplementary feeding of school children; such is, in fact, its main purpose. It is addressed not only to governments and technicians directly concerned with organizing school meals, but also to voluntary organizations, which might use their influence to promote measures favourable to children, and to public opinion, which can hasten the adoption of such measures by bringing pressure to bear on governments."

Historical Background

School feeding was originally mainly a charitable work undertaken by benevolent societies to assist needy and undernourished children. During the second half of the nineteenth century the development of primary education brought together in the schools a large number of poor children. At the same time there grew up a feeling of social responsibility towards these children, their welfare and care. In certain countries national defence policies required the good physical state of conscripts. Moreover, educators soon realized that children who were underfed and in poor health had difficulty in learning.

All these factors bore weight, but from 1920 onward the whole of the move-

* Dr. Massal is Executive Officer for Health to the South Pacific Commission.

ment was influenced by a new and important element; the modern science of nutrition. It was understood that children not only needed to eat in sufficient quantity but also to eat what was best suited to their organism. It was also recognized that in the majority of countries even when children receive sufficient food, the diet is not rational and their health is affected by it. The result was that school feeding was organized scientifically so as to correspond to physiological requirements.

School feeding has become a generally accepted measure, established on a scientific basis and with clear definite aims. In its modern form its purpose is to improve the state of health of school children in order to produce strong, healthy and active individuals; other motives are, at most, of only secondary importance.

Composition of School Feeding

Certain basic information on diet and food habits, on the state of nutrition and economic conditions is necessary in order to establish any practical nutrition programme intended for any given group of people. Data vary greatly from one to another; thus, it is not possible to produce a uniform method of school feeding suitable for all countries or even for all areas of one country. There do exist, however, certain fundamental nutritional principles which should form the basis of all school feeding; it is for nutritionists to adapt the programmes to national or local conditions.

The main types of meal provided can be grouped under two headings: the complete meal, usually served around midday, and the snack or light meal served at a suitable moment in the course of the day. Food, personnel and facilities available help determine the type of programme most easily operated.

To be entirely satisfactory the school meal must not only have high food value, but it should also be economical and easily organized; as far as possible use should be made of foodstuffs locally produced. The snack form is used in cases of food shortage, inadequacy of financial resources or lack of facilities for preparing and serving a complete meal.

The standards fixed for the composition of meals and snacks vary from one country to another, but the general aim is to provide a high percentage of the nutritive elements recognized as being essential to children. In composing menus, however, account should be taken of seasonal variations in food production and in price.

Meals can be prepared either in central kitchens from which food is distributed in suitable containers, or else in a kitchen attached to each school. The latter system seems more simple; it does not prevent wholesale purchase of foodstuffs which can be distributed as bought, but it does, however, require a larger staff; the active co-operation of the pupils' parents has produced some worthwhile results; their presence during meals is a valuable psychological factor.

Several studies have shown that milk has a better effect on growth and health than other types of supplementary food. Whole, liquid milk, guaranteed "healthy", is preferable, but in many countries it is produced in insufficient quantity. In such cases processed milk can be used, skimmed milk in powder form, which includes the majority of the main nutritive elements found in fresh milk, is less expensive than processed milk sold in other forms; furthermore, packing and transport costs are relatively low. It can be used alone, sweetened, with the addition of cocoa, or incorporated in familiar dishes. Preparation in sweet or tablet form is readily accepted by the children.

The unavailability of milk of any type in a number of areas has led to using foodstuffs which are or which might be locally produced. The type of local foodstuff suitable for the purpose generally varies from one country to another according to the nature of native food production, the economic situation and food habits.

Methods of preservation, preparation and utilization call for further definite research; school feeding programmes can serve, in a given country, as a trial ground for the introduction of new foodstuffs and unusual methods of preparation.

Moreover, it must be realized that in countries where school feeding does not yet exist, the establishment of even limited programmes can arouse lively interest in child nutrition and encourage the development of food production, thus bringing eventual benefit to the country as a whole.

Effects on Health

Assessing the effects of food eaten at school on the child's nutritional status sets a certain number of problems which still remain to be solved; the present methods of assessing the least obvious changes are not on the whole satisfactory. Moreover, the food received at school forms only a part of the total intake of the child. Effects easily demonstrated by measuring or clinical examination are hardly conclusive except in cases where the family diet is very poor and the school meal very rich. It is, however, admitted that even a slight improvement in the child's diet will have favourable effects on his health, physical development, and agility of mind. The numerous tests carried out in different countries on school children of varying environments and races have proved conclusively the nutritive value of milk as a supplementary food. Another food of value is the "Oslo snack" which, as is known, consists of milk served with biscuits or rye bread spread with vitamin reinforced margarine, cream cheese, cod-liver paste and a raw carrot, apple or orange, according to the season.

Despite conflicting results, soya milk, whether liquid or clotted, seems more or less equivalent in value to cow's milk. The value of mixtures of cereals and pulses, of which the proteins supplement each other, is demonstrated by the encouraging results obtained.

The favourable effects of school feeding on the health of school children and on their ability to learn, are particularly apparent when such feeding is under satisfactory supervision and carefully composed by specialists, taking into account the family diet in such a way as to remedy obvious deficiencies. Spectacular results are obtained with children receiving supplementary food or meals and whose normal diet is largely deficient both in quantity and quality.

Educational and Social Aspects

The aim of school feeding, we repeat, is to improve nutrition and the state of health of school children. It is generally admitted that it can also be of educational and social value.

Through the child it can be expected to reach the family, encouraging it to increase the quantity and quality of foods grown and used, and adopt improved methods of preparation and cooking. To achieve this, the way in which foodstuffs are prepared and eaten at school should not differ too greatly from family practice, and the child should receive practical instruction, demonstrating and explaining to him the "why" and "how" of things. The objection that this practical training affects school work is not justified by the results of surveys made.

School meals can provide an excellent opportunity for testing the acceptability of a new foodstuff, and of making it known and appreciated.

The attitude towards food and feeding of teachers and other members of the staff concerned with school feeding and with whom the child comes into contact is an element of capital importance, for the child, who is very receptive to the ideas and habits of his elders, often tends to copy them.

Socially, it is admitted that the school meal strengthens relations between children with different backgrounds and prepares them to take their place in society by showing them the different attitudes of their fellow-pupils. Sometimes, however, this meal can, to a certain extent at least, conflict with current religious and social conceptions, for meal time is the moment when the whole family, scattered throughout the rest of the day

at its various occupations, is reunited, and the mother is often anxious to see all its members gathered around the head of the family.

The possibility of parents taking less care with their children's diet, since they receive a meal at school, has also been raised; and few investigations made on this score scarcely prove this to be so.

In a few countries it has been observed that the introduction of a school feeding programme encouraged attendance at school and decreased absenteeism; this rise in school attendance creates problems of staff and premises, which are also bound up with the duration of compulsory school attendance, and the national education system.

Therefore, in order to fulfil its educational and social role in the best possible way, school feeding requires a division of responsibility; parents in particular should feel they are participating closely in the work in hand. The means of persuading them to take an active interest in school feeding are very numerous and their application varies according to environmental conditions.

Availability of Foodstuffs and Their Distribution

School feeding programmes can, if they are wide in scope and applied with a view to nutrition education, help modify diet by placing the emphasis on nutrition requirements; thus, it is possible that the need for total reorganization of food production may arise.

A vegetable garden adjoining the school might provide produce directly for use in preparing school meals. Gardens of this sort have been instituted in various countries. They might be used too for nature study and some schools have made use of them for teaching practical elementary horticulture and family mixed farming. In several countries the school vegetable garden is a means of accustoming children to grow and eat new produce. This requires teachers to possess some knowledge of the rudiments of agriculture or else periodical visits to the schools by technical advisers.

School feeding programmes can be made in conjunction with schemes for developing certain food resources in a community, tinned goods for example; or else can provide the means, in some countries, for using up surplus goods which would cause a fall in cost price were they to accumulate on the market. The operation of such programmes, although comparatively simple at the local level, require nationally or internationally good administrative organization and essential facilities for storage and distribution of stocks.

Administration and Organization

Ways of operating school feeding programmes vary according to the type of programme. Experience to date shows that control of school feeding can either be entrusted to a single department: national education, public health, agriculture; or else on the other hand, run conjointly by several public administrations, as well as local groups. In fact, co-operation seems to have been an element of most of the successes recorded.

The method of financing programmes also varies. Expenses can be covered by funds provided by the State or by local authorities, by family contributions, by gifts or sometimes by funds from an international source. Whenever the resources available allow for no more than a modest school feeding programme, an attempt should be made to give first benefit to the most needy children.

Foodstuffs count for an important part of the total cost of the programme. It is not necessary to buy expensive produce to provide a satisfying meal which is both nourishing and pleasing to the children. Knowledge of current prices, seasonal food variations and bulk purchase, provided there are storage facilities, will help reduce expenditure.

A serious difficulty is often the lack of qualified staff for preparing and serving food. Endeavours should be made to recruit persons wishing to work part-time. Elsewhere the school children themselves might help prepare and serve meals. Finally, pupils' parents might sometimes be called upon.

As a general rule a choice will have to be made between the individual school kitchen and the large central kitchen serving several establishments. Both have their advantages and drawbacks; the decision will be made in view of local conditions and possibilities. A mixed system of centralized buying, storage and preparation of foodstuffs and decentralized cooking operations may also be considered.

Supervising the nutritive value of foods is of considerable importance, particularly when a meal is served and not merely a snack, the composition of which is more or less uniform. The nutritive value of a daily meal varies according to the foods chosen, the method of preparation, the time allowed to elapse between cooking and serving of the meal. Careful supervision will make it possible to detect mistakes, refusal of children to eat the whole of the portions served, and waste. It will sometimes be found possible to make periodical laboratory analysis.

Financial control, administrative and technical inspection are absolutely essential to ensure the effective operation of school feeding programmes. They should be organized in such a way that errors and inadequacies are easily detected. The active and ready co-operation of the teaching staff is essential; it should be sought by all possible means.

Asian-Pacific Tuberculosis Conference Held in Sydney

THE Asian-Pacific Tuberculosis Conference arranged by the National Association for the Prevention of Tuberculosis in Australia in full collaboration with the Commonwealth Department of Health and the Department of External Affairs was held in Sydney from August 15-21.

It was attended by official delegates (most of them from Australia and South-East Asian countries), delegates of voluntary organisations and members from the six Australian States. The World Health Organization was represented by Dr. Johs. Holm (Geneva), Dr. de Marchi (Pakistan) and Dr. L. O. Roberts (Philippines). Dr. J. T. Gunther, Director of Public Health, led the Papua and New Guinea delegation and opened the discussions on the subject—"Public Health Problems of Tuberculosis amongst Unprotected Peoples". Other subjects on the agenda were: "The Present Position of Antibiotics in the Treatment of Pulmonary and Extra Pulmonary Tuberculosis"; "The Present Position of Tuberculin Testing and BCG in the Control of Tuberculosis"; "The Role of the 'Team' in the Control of Tuberculosis". Dr. J. S. de Vries represented Netherlands New Guinea and Dr. Macu Salato the Colony of Fiji. The South Pacific Commission was represented by Dr. E. Massal, Executive Officer for Health.

At the end of the four-day Conference it was agreed that the control of tuberculosis called for co-operation between national, international and local health services and voluntary organisations.

Tuberculin tests, X-ray surveys and bacteriological examinations should be combined to evaluate the prevalence of tuberculosis before control programmes begin.

Home treatment with anti-TB drugs, especially isoniazid, is playing an important part in the control of the infection. Further investigation is nevertheless necessary.

Home drug treatment does not eliminate the necessity for segregation and other accepted preventive measures.

In countries where the incidence of tuberculosis is high and control facilities are inadequate, mass BCG vaccination is recommended.

Where tuberculosis is less prevalent and control facilities are adequate, BCG vaccination programmes should be concentrated on high risk groups.

The training of local personnel is essential for the success of any control programme. The role of the "team" and its various members was emphasized in all stages of activities in tuberculosis control.

Taro Study By New Zealand Botanist

SPECIMENS of varieties of taro are sought from *Bulletin* readers by Dr. Robert C. Cooper, Auckland Museum Botanist, who, in a letter to the Editor, writes:

Sir,

Recently I began the study of taro varieties with the aid of a Yale-Bishop Museum fellowship.

In July I visited Fiji and received invaluable assistance from Mr. B. E. V. Parham, O.B.E., Deputy Director of Agriculture, and field officer Filimone Raigiso in locating 43 varieties of taros. Many of these were established in the collection of the Plant Introduction Station at Naduroloulou, and others we gathered in the market at Nausori and in school and private gardens in the Tai Levu district. I am deeply indebted to all who gave me specimens.

At present I am at Tahiti, where Mr. R. Milland, *Chef du Service de l'Agriculture*, and Jacques Barrau, Subsistence Agriculture Officer of the South Pacific Commission, have given most generously of their time to enable me to gather specimens of 21 varieties of taro. These have been air-freighted to the Plant Introduction Station at Naduroloulou, and will be grown with the Fijian varieties. I will visit the Cook Islands and Samoa before I return to New Zealand, and I hope to send specimens of the Cook and Samoan varieties to Naduroloulou.

The purpose of my work:

1. To compare the "Maori" taros of New Zealand with those of other islands. Clones of taro persist in several localities in the north of New Zealand, usually near old "pah" sites, and I think that at least two varieties are present.
2. To study the variation in the taro collection assembled at Naduroloulou by the use of multiple characters or pictorially by scatter diagrams. This technique was devised by Professor E. S. Anderson, Director of the Missouri botanical garden, and is described in recent issues of the annals of the garden. It has been used successfully for the study of maize varieties. With this technique it is possible to illustrate the pattern of variation within a variety and within a species and to suggest possible relationships of the variants.

Although the choice of characters to measure and diagram is subjective, the method is quantitative and has the advantage of being repeatable. Until more elegant mathematical techniques are devised, it seems the most promising one for the study of variation in cultivated plants.

In Fiji and Tahiti I was most fortunate to meet growers who knew the names and characters of their varieties. For the Fijian varieties it was not difficult to compile a key which might be useful for field officers and others who need to recognize particular varieties of taro.

Such recognition is, of course, an essential prerequisite to any programme of selection.

Yield tests, etc. Such work is outside my field of study. I would like to compile useful keys and description, however, if there is a need for such information.

It would be of great assistance to me if readers of this letter could send specimens of varieties of taro in their area to Naduroloulou. The address of the Station is: Care of the Department of Agriculture, Suva, Fiji.

About one foot of leaf stalks with an inch of the tuber attached, from a medium or large plant, is sufficient for planting and will survive for about a week. The following notes on the specimen would be most useful:

1. Local name.
2. Where gathered.
3. Colour of the base of the leaf stalk where it joins the tuber.
4. Colour of the middle or upper part of the leaf stalk.
5. Colour where the stalk joins the blade of the leaf—inside, —outside.
6. Colour of the veins of the underside of the leaf.
7. Colour of the "piko"—the point where the veins meet the stalk on the upper surface of the leaf blade.
8. Colour of the skin and flesh of the tuber.

I will be very happy within the limits of my grant to refund the cost of air-freighting varieties to Naduroloulou, but will of course have to cry "Halt!" if too many pour in.

I suggest to contact me by letter before sending any specimen to Naduroloulou. Thus, useless duplication would be avoided.

Mr. D. Yen of the Vegetable Research Unit of the Crop Research Division, Department of Scientific and Industrial Research, Papatoetoe, New Zealand, has gathered and grown several of the varieties of sweet potato formerly cultivated by the Maori people, and we are anxious to obtain old varieties of sweet potato from elsewhere in the Pacific to compare with them. I should appreciate it greatly if readers would let me know of any varieties of olden times still grown in their neighbourhood.

ROBERT C. COOPER.

FAO Conference On Livestock Production

DR. A. H. J. KROON, Executive Officer for Economic Development, acted as observer for the South Pacific Commission to the FAO meeting on livestock production under tropical conditions, held at Brisbane, Queensland, from August 22-26. This meeting brought together delegates from 14 different countries under the auspices of the Food and Agriculture Organization of the United Nations. The Government of Queensland acted as host, while the Australian Government had offered study tours through the State.

Delegates coming from South Pacific territories were: Dr. W. J. A. Payne, Animal Husbandry Officer, to the Department of Agriculture, Fiji, and Mr. J. M. Marley, Chief of the Division of Animal Industry, Papua and New Guinea Administration.

The information given by Dr. Payne on investigational work on pasture and animal production of the Sigatoka Agricultural Station formed an outstanding contribution to the meeting.

The report of the conference contains valuable information on such subjects as:—

Improvement of livestock through breeding;
improvement of livestock nutrition under tropical conditions;
management factors affecting livestock under tropical conditions;
improving livestock production through better control of diseases and parasites; and,
national services to the livestock industry.

The conference made it clear that there are still many gaps in existing knowledge on many problems. It considered that an intensive survey of nutritional practices and accurate measurement of performance would lead to a better understanding of nutritional problems in the tropics. Conservation and storage of fodder under various tropical conditions need fuller investigation. The same holds true for mineral and trace element deficiencies, vitamin status of livestock, supplementing low quality roughage, the calcium and phosphorus levels and ratios in the ration, the type of housing in relation to Vitamin D requirements and the nutrient requirements of livestock under tropical conditions.

Attention was drawn to the importance of using identical twins in the study of the performance of similar cattle under tropical, sub-tropical and temperate conditions. The information on the varying response of different breeds to different levels of nutrition needs to be supplemented.

The need was felt for a continuing working party on livestock production.

However, there is not only an urgent need for more research; attention should also be given to the training of adequate numbers of personnel for the development of extension services.

An engineer of the Commission taking samples for soil analysis on the Kebar Plains, in north-west Netherlands New Guinea.

Truck-loads of sand ballast for a narrow-gauge railway being built to open up newly-cleared jungle, in the Koembe River area.

Agricultural Development Of Netherlands New Guinea

In 1953, an official advisory commission visited Netherlands New Guinea to study agricultural development possibilities of that territory. This review of the Commission's report appeared in TROPICAL ABSTRACTS *for November 20, 1954.**

By J. M. J. BRANTJES

IN February, 1953, the Netherlands Minister of Overseas Territories appointed an "Advisory Commission on agricultural development possibilities in New Guinea." The Commission was presided over by Mr. L. Gotzen, a former Minister without portfolio whose work was closely connected with that Ministry, while the members were all experts in the fields of agriculture, agricultural techniques, irrigation, cattle-raising and forestry, including four professors on the staff of the Agricultural University, Wageningen. This Commission visited New Guinea between the middle of June and the beginning of September, 1953. Its detailed report was submitted to the Minister in April, 1954.

When drafting its report, the Commission allowed itself to be guided by the motto, cited on the first page: *To undertake and above all promise no more than can certainly be performed is the most elementary political wisdom.*

The Commission has restricted itself to indicating certain basic principles and suggestions, which require working out in greater detail. A differentiation is made between a long-term development plan, which will depend on the possibility of incorporating the autochthonous population in its realization and the progress made in scientific research, and a short-term plan, designed to bring about a rapid increase in the production of food crops and to accelerate forest exploitation, the primary consideration being the attainment of self-sufficiency. The labour problem is cited in the introduction as being one of the greatest bottlenecks in the development of New Guinea.

The decision to start the study tour with an 18-day visit to Australian New Guinea, a territory where developmental progress has been greater in many respects than in its Dutch counterpart, was a sound one. Chapter II of the report lists the Commission's impressions of that area. Attention is drawn, among other things, to the organization of the Administration, the fact that no income tax is levied, the low import duties, the industrial development now in progress, the important part being played by private enterprise, the land allocation regulations relating to the establishment of private undertakings, recruiting of labour, communication facilities (3,000 miles of highways, more than 100 airfields, 15 vessels up to 300 gross registered tons, radio communications), etc. Attention is also drawn to the establishment of "Rural Progress Societies", which aim at stimulating auto-activity on the part of the indigenous population, and which are to be regarded as forerunners of co-operative societies. The Commission's visit to Australian New Guinea opened new perspectives and led to the creation of useful contacts.

After describing the country and people from an agricultural point of view, Chapter III goes on to survey the climatological conditions, while mentioning the fact that little progress has been made to date with regard to soil research. The Commission believes that the development of Netherlands New Guinea is chiefly a question of raising

* **Tropical Abstracts** is a fortnightly publication of the Royal Tropical Institute (Tropical Products Department), Amsterdam.

Bagging and stacking peanuts in a co-operative warehouse built for the storage of produce in the Nimboran area.

the labour productivity of the population. This will only be possible when structural changes have been effected in the primitive form of society prevalent there. Community development provides the only right answer in this connection. The report urges the regulation of land ownership, effective labour legislation, coupled with increased research, information dissemination, the construction of roads and airfields, etc., in which the Government must lead the way for private capital, which, with the exception of the oil industry, is almost entirely absent. A lower level of prices and costs will have to be realized, in order to stimulate exports.

Chapter IV is devoted to the agrarian development possibilities. A rapid expansion cannot be anticipated, as the necessary preliminary to this is the development of the autochthonous population itself. The present shifting cultivation system will have to be abandoned in favour of the permanent use of land, prime considerations being the maintenance of soil fertility and soil conservation. This is not only a technical, but also a social problem, when attention will have to be paid in turn to community development, trade training and settlement projects. This permanent type of agriculture will have to be characterized by family-size mixed farms (combining agriculture and dairy farming). After discussing the various potential crops, the Commission comes to the conclusion that the export crop offering the most promise in Netherlands New Guinea appears to be cocoa.

The development of forest management and exploitation is also of vital importance to New Guinea's future. The inventarization of the country's forest resources is still in its very early stages. Aerial photography, which can play a great part in agricultural, mineralogical and other surveys, is therefore indispensable. The expansion of scientific research is urgent. The saw-milling capacity will have to be increased and improved as soon as may be practicable. A technical and economic investigation into the processing and export of sago flour and mangrove tannin will probably open up new prospects.

In view of the great shortage of labour, serious consideration will have to be given to the possibility of mechanizing agriculture. The wet climate and the frequently marshy and clayey soil in the northern part of New Guinea will render integral mechanization impossible in that area. Partial mechanization possibilities will have to be investigated, e.g., in the Ransiki-Momi (Vogelkop) area; Merauke, with its sharply defined dry periods, offers greater possibilities in this respect.

The Commission recommends that an approach to industrial development be made by establishing small coconut oil undertakings, fodder production units, repair workshops, blacksmiths, construction workshops, saw-mills, carpenter's shops, furniture making units, and enterprises concentrating on the production of building materials.

Chapter V suggests a number of projects for incorporation in both the long and short-term development plans. One of the most important of these projects is community development. The Administration will have to create favourable conditions for road-construction, education, hygiene and health care, and an extension service. It is suggested that 25 of these communities should be established, the total costs being estimated at £50 mill., spread over a period of 20 years. The Commission's second project covers agrarian and forestry research. It is considered desirable that a co-ordinating organization be established embracing all the tropical areas within the Kingdom of the Netherlands, part of the research being carried out in the Netherlands. This would obviate the dissipation and duplication of effort, and create the possibility of exchanging research workers, thereby stimulating them and encouraging their interest. This research will also have to be extended to cover aerial photography in the service of agriculture, forestry and surveying.

The Commission recommends that an experiment and training station should be established in Ransiki for the benefit of medium-sized farms, around which ten farms could be opened every 2 years, up to a maximum of 50 in 10 years. These could be farms of about 30 ha*, 10 ha of which would be planted with cocoa, the remaining 20 ha being arable land. A cocoa experiment station should also be set up in this area.

One of the most important projects devised by the Commission relates to a rice and cattle-raising scheme, which could be realized in the vicinity of Merauke. The climate is suitable for mechanization there, while the quality of the soil requires a mixed farm employing irrigation. A start would have to be made with an experimental polder covering 200 ha. If this proves successful, it can be expanded into a larger project, which could finally be extended to 12,000 ha, 6,000 ha being planted with rice on a rotation basis, and the other 6,000 ha being used as an artificial pasture for cattle. This would mean a rice production of 8,000 tons and a meat production of 400 tons annually in the long run, these quantities being sufficient to meet New Guinea's domestic requirements. The total costs involved in constructing the polder are estimated at around 40 mill. guilders.

In addition to expanding forest research and survey, the Commission also recommends the establishment of two sawmills and urges that funds be made available for forest exploitation and reafforestation. The financial consequences of these plans are estimated at 232 mill. guilders, spread over a period of twenty years. The financing, it is stated, should be carried out via a welfare fund, which would ensure continuity. Reviewing the whole field falling within its scope, the Commission categorically stresses the fact that its agricultural development plans must be regarded as part—albeit an important part—of the overall development plans for New Guinea as a whole.

I would like to conclude with the remark that the Agricultural Commission's report is a work of great merit and will certainly prove extremely valuable as a

* One hectare equals 2.25 acres.

Ironwood logs at a coastal depot in Netherlands New Guinea, awaiting transport by sea to a sawmill. The Advisory Commission considers the development of the timber industry vital to the future of the territory.

basis for the agrarian development of New Guinea. As was perhaps only to be expected, the plans for this vast, impenetrable and rugged country show a certain lack of cohesion.

Rapport van de Commissie van Advies inzake de agrarische ontwikkelingsmogelijkheden in Nieuw Guinea. (Report of the Advisory Commission on agricultural development possibilities in Netherlands New Guinea. Published by the Ministry of Overseas Territories, The Hague (1954). 314 p. App. Graph. Map.

Inter-American Technical Committee On Cacao

Main Recommendations Of Fifth Meeting Invite International Cooperation

THE Fifth Meeting of the Inter-American Technical Committee on Cacao was held in Turrialba from July 4-10, 1954. Seventy-seven delegates, including observers representing sixteen countries and thirty-four institutions, attended this meeting, at which a total of 39 papers were submitted and discussed.

In view of the increasing importance of the cacao industry in the South Pacific, the main recommendations of this body of world experts on cacao are given below. They are:

(1) That there be a clone catalogue administered by the Inter-American Cacao Center using the forms and instructions drawn up by the Center as amended and approved by the sub-committee on plant improvement.

(2) That in future the Cacao Center of the Institute be the authority responsible for the collection of clonal cocoa and distribution to other countries.

(3) That there be a uniform method of expressing efficiency on cocoa propagating stations and, that this be expressed by the symbol "PE" (propagation efficiency) which is the number of plants produced (ready for distribution or field planting) from every 100 cuttings set in rooting bins, and the symbol "RE" (rooting efficiency) being the number of cuttings rooted from every 100 cuttings set. The overall efficiency of a station would thus be indicated by using both symbols "PE" and "RE".

(4) That cacao-growing countries be invited to submit to the Cacao Center, Turrialba, lists of shade trees (divided into those in common use, under trial, and possibilities) such lists to give the following information: local and botanical name; general characteristics such as: rate of growth; type of canopy; height and rooting system.

(5) Concerning methods of selection, the Committee's suggestions are as follows:

(a) a search should be made in each country for trees possessing desirable characteristics;

(b) this should be carried out by the technician of the Experiment Station with the assistance of the Extension personnel and cacao producers;

(c) this work must have a permanent character;

(d) the area of cacao population where selections are to be made should be representative of the total population;

(e) immediately after the first crop, outstanding trees must be multiplied asexually at the experiment station to submit them to comparative tests;

(f) to determine the real value of a selected tree, data must be taken following the recommendations made by the sub-committee working on the clone catalogue.

(6) The sub-committee on plant diseases and pests recommended that information be gathered by cacao technicians from different cacao-producing areas throughout the world and be forwarded to Dr. Desrosiers of the "Estación Agricola Tropical des Ecuador", Guayaquil. When he has enough information he will prepare a preliminary map showing the distribution of the principal diseases and insect pests as well as a list of those reported in the various areas. This information will be kept up to date through correspondence and from contacts made by pathologists of the sub-committee and other technicians. It is expected that the preliminary map will be changed from time to time and issued with a disease and insect list accompanying it.

(7) That the U.S. Department of Agriculture Library prepare a bibliography on the cacao literature published during 1950-1954, making it as comprehensive as possible. This bibliography would bring up to date the one that this Library prepared in 1950.

(8) That the Library of the Inter-American Institute of Agricultural Sciences prepare an annual list including all the cacao literature published during the year, indicating all those publications available in the Institute Library. For this purpose it is requested that all cacao technicians send copies of all their publications directly to the Library of the Institute.

(9) That all institutions with collections of cacao literature prepare and distribute bibliographical lists including this material. These lists would be of value in making known the sources of cacao materials in the different countries and in locating publications difficult to obtain.

(10) That cacao technicians working on some phase of cacao research and thoroughly acquainted with the Literature on the problem co-operate in preparing review articles for publication in Turrialba or any other suitable publication.

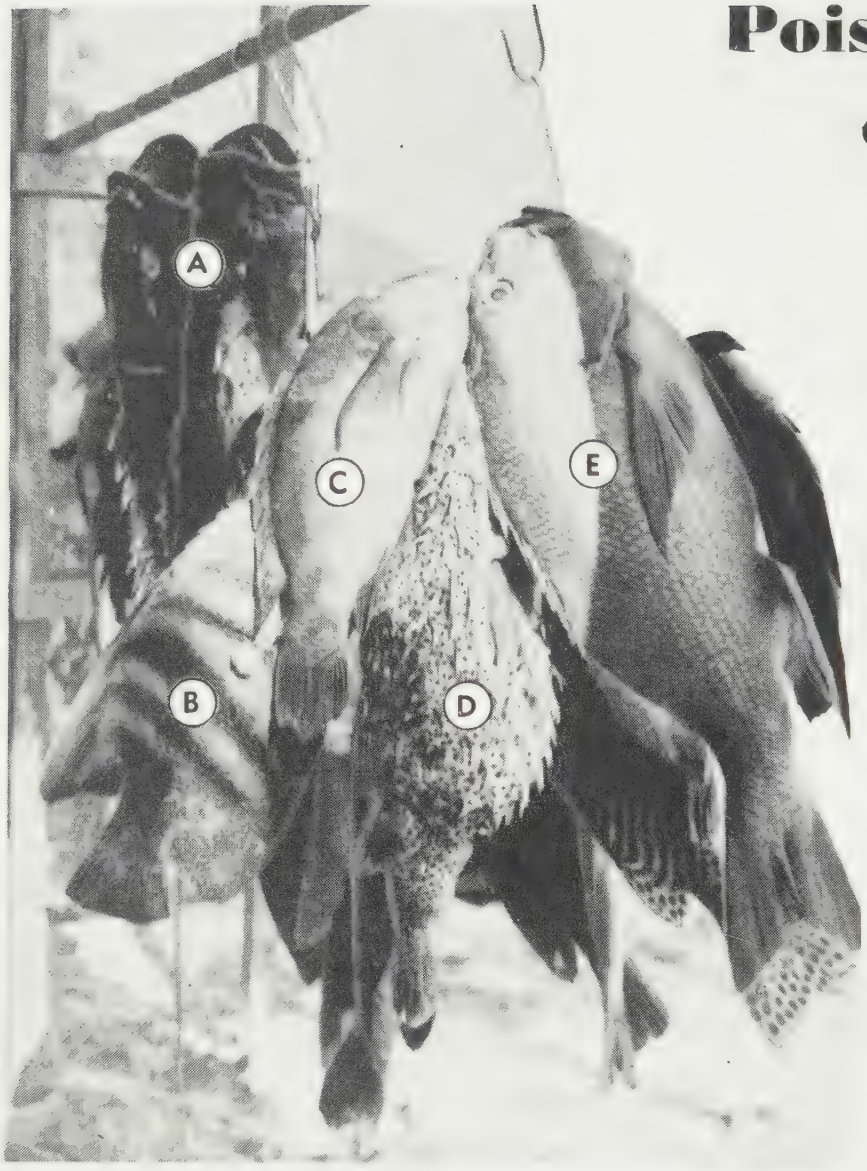
As can be seen, the foregoing recommendations open the way to wide international co-operation directed towards cacao improvement, and South Pacific territories can only profit by joining it.

—E.J.E.L.

Poisonous Fish of the South Pacific

Certain species of tropical fish are well-known as being dangerous to eat. Others, however, are poisonous only if eaten at certain periods, or if taken from certain localities. As there is no rule to determine either, or simple test to reveal toxicity, fish poisoning is common in the tropics. The problem is surveyed below by the author, who urges further research to determine causes and cures.

By GUY LOISON*



A varied catch, taken in reef waters of New Caledonia. A, "loche saumonée", or sea bass; B, butterfly fish; C, parrot fish; D, porcupine fish; E, "big-lips". Of these, the porcupine fish is undoubtedly poisonous. "But", asks the author, "can the others be eaten without danger?"

THE idea of writing this article for the *Bulletin* originated after a bout of fish poisoning: I had eaten a "loche saumonée" (*Plectropomus maculatus*) caught while spearfishing, and it had been cleaned and cooked the very same day.

The aim of this article, however, is not so much to recount my own misfortunes as to encourage readers to inform the Commission of similar cases which no doubt frequently occur in various South Pacific territories.

I have often attended to patients complaining of skin, digestive or nervous troubles which they attributed, often with rather too much readiness, to having eaten a fish of dubious quality the previous day. The remnants had been thrown away, thus making identification impossible.

Several obstacles are encountered in making an epidemiological survey. The same species is not poisonous throughout the year; very often the period when the coral is "in flower" is considered dangerous. The influence of the moon is also suggested—not without foundation, since it has been proven scientifically as regards the toxicity of medicinal herbs, for instance.

Moreover, a particular rock of coral, bed of algae, or sandy hollow in the same lagoon may be reputed to be contaminated to a higher degree than the rest. In New Caledonia fish poisoning is common at Canala (on the east coast) but seldom happens at La Foa (on the west).

It takes an experienced fisherman to state with assurance: "Don't eat such-and-such a fish caught at a particular place on such-and-such a day." And even the cleverest are sometimes caught.

The islanders say they can tell whether a fish is poisonous or not by its colour, the appearance of its gills or the bitter taste of the liver. Some of them use the well-known silver coin method as country folk still do in Europe when cooking mushrooms. We could hardly expect them to take extracts by the alcohol method for intraperitoneal injection to mice, but they might, however, make use of "gustatores" such as, for example, their cats and dogs.

The islanders also claim: "If there are living worms inside the stomach of the fish it is safe," and "Do not eat an animal if your hands itch or feel inflamed when you clean its flesh."

I have witnessed an empiric test used in New Caledonia which consists of placing the liver of the fish on an anthill. If the ants run away, the fish should not be eaten.

It is a current opinion among fishermen that big fish or deepsea fish are more poisonous than smaller ones or those caught in lagoons. In parts of the Marshalls, they say, the only poisonous fish are those found in the passes. The tail end is often considered less toxic than the head or middle of the body; the poisonous substances circulate in the blood (their presence was proved as early as the last century in eels, conger-eels and moray eels) and when the fish is caught, bleeding occurs most freely at the head end. In Hawaii, the brain of the surmullet (its flesh was considered

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a delicacy by the Romans) is said to cause mental disturbance and delirium.

Once the fish is dead, the toxins contained in the viscera spread rapidly through the adjacent flesh. The flesh itself then becomes pathogenic.

Warm-blooded animals are particularly liable to be affected by absorbing this flesh, whereas fish, crabs and sea snakes feed on it with impunity. Farmyard poultry, fed on the left-overs, die by the dozen.

Biologists use rats and mice for laboratory experiment. Loss of hair is a frequent symptom in cats and dogs and has also been observed in humans. Indeed, fish poisoning can cause disturbances of varying gravity. I remember one Sunday in New Caledonia (Saturday is the regular fishing day) a whole native family being brought into hospital in a state of deep coma.

I diagnosed the cause of my own particular case on the very first day, when I got up and washed my hands. It was certainly the cold tap I had turned on, and yet I started at the excruciating burning pain experienced. This sensation was to last for several weeks. Similarly, drinking a cold beverage caused an unbearable impression of agonising burning.

Gastro-intestinal troubles were of minor importance, and ended after 48 hours, leaving me to cope with a far more unpleasant symptom: a general itching that continued constantly for a fortnight, forcing me to contort my body into the most grotesque positions and scratch without stopping. Moreover, I would wake up every night, not because of the spasmodic twitching of my legs but because I had the impression my teeth had become loose and were about to fall out of their sockets.

The final and most difficult effect to bear was the ensuing state of exhaustion which lasted some three or four months. My thighs in particular were weak and painful as though they had been given a thorough beating. Those familiar with fish poisoning tell me I was lucky to get away with few and such slight symptoms: I might have suffered from vomiting, abdominal pains, fever, excessive perspiration, pains in the joints, numbness of the lips and tongue, motility inco-ordination, various paralyses of the motor and vegetative systems, temporary blindness, and other similar troubles.

However, diagnosis could allow of no doubt. There was no chance of mistaking this for a case of food poisoning from decaying fish, of the botulism or paratyphoid type. I remember how a friend of mine died, actually of a heart complaint, having refused to see a doctor about his breathlessness, pains in the chest and a persistent feeling of weakness, all of which he attributed to having been poisoned by fish three months before.

You will perhaps consider my illness lasted a very long time, and that, being a doctor, I might have followed some more drastic treatment. In fact, I did what everybody else does in the South Pacific: I drank, with no firm conviction, quarts of an infusion of "itch herb" (*Messerschmidia argentea,* Linné).

Those of my readers who live in the Pacific will have learnt nothing new from my story. Such cases, indeed, are common in all the territories.

The first and most famous European to suffer from fish poisoning through eating swell-fish in New Caledonia was Captain Cook himself, during his second voyage of exploration in 1774. The excellent description he gave of his symptoms is worth reading. In particular, he was amazed at his inability to distinguish between the weight of a feather and that of a decanter of water.

Recorded Fatal Cases

In Netherlands New Guinea, a few years ago, four fatal cases have been recorded; the patients died in Fakfak, two hours after eating "Ikan Bibit", whose heart and liver only are considered poisonous. In Sorong it is commonly known that various species of "Sanguine tjekalang" (tunas) cause severe itching. In several villages of Seroei (Japen Island) the flesh of the indigenous "Ikan peroet besar" or "Kobo boi" (swell-fish) is said to be eaten without ill effect. Admittedly a number of sub-species do exist, but most of them cause the same fatal aftermath of dizziness, vomiting, diarrhoea and coma, for which there is no known antidote.

Highly-poisonous toad fish (also known as swell, or puffer, fish) speared in New Caledonian waters.

In Polynesia, the same species are also considered poisonous but at every new visit to an island new names can be collected; indeed, the list is so long I wonder whether it would not have been easier to write an article on fish reputed to be non-poisonous.

At the beginning of the century, in American Samoa, *Mymea, Taiva Uliuli, Filoa, Ataata, Algo,* file fish and *Sue* (swell-fish) were declared harmful. Since then, *Mu, Saosao, Vaola, Maoae* and *Ugavau* have been added. Moreover, any fish which eats the *Ana* alga is said to become poisonous. From October to November, during the season when palolo (the milt of *Eunice viridis,* an annelid) is abundant, cases of fish poisoning also appear to be numerous, although palolo itself is eaten in quantity without ill effect.

During the war, 400 Japanese died in Micronesia from eating poisonous fish. In the Marianas, an American ship was held up because half of its crew were sick from eating barracuda. In Saipan the problem is of such magnitude as to render the organization of any fishing industry impossible. The islanders eat a few species of fish with which they are perfectly familiar. In 1949, 57 Philippinos fell ill after a meal of moray eels; two of them died.

In the Marshall Islands in 1953, the flesh of a black moray caused five deaths. In 1950, 35 cases of fish poisoning were recorded at Kwajalein, also six in Majuro and three in Ponape.

In 1944, poisonous fish from Midway and Christmas Islands caused panic on the Hawaiian market, resulting in an estimated loss of thousands of dollars. On Johnston Island (usually uninhabited) 75% of species are dangerous. Twenty cases of fish poisoning were recorded in 1950 among personnel of the U.S. army base. On Sydney Island (Phoenix), fish poisoning is held responsible for the high infant mortality rate.

In Fiji, at the meeting-point of Micronesia, Polynesia and Melanesia, we again find the species mentioned above. Listing them rationally is difficult for a non-ichthyologist, as everybody, even Europeans with a scientific training, uses their native names. An Indian pointing to a trigger-fish called it by a name (Ndamu) which represents a Lutjanidae for Europeans. A reference book listing synonyms used in the South Pacific territories would, in my opinion, be useful. In Fiji "Ika Ndamu" has been responsible for several deaths. Ulavi (parrot-fish) takes its toll here as elsewhere; and the palolo season has the same fatal reputation.

In the high islands, where cattle and game are found, the proportion of fish-eaters is smaller than in the low islands, and cases of fish poisoning are relatively less numerous. However, fish poisoning is an important medical and social problem in those territories where fish is one of the main components of daily diet (providing almost the entire protein content).

A typical illustration is Fanning

Island. Up to 1946 the population (224) of this atoll had eaten all species of fish. However, between February, 1946, and April, 1947, 95 cases of fish poisoning occurred. Before that date the inhabitants were only wary of the swell-fish (*Tetraodon*), and that only to a certain extent since, after removing the toxic viscera (especially the genitals) they would use it to make soup.

At the time when the epidemic of fish poisoning broke out more than ten species were claimed to be responsible. There was a doctor on the atoll who advised the population to eat only fish that had been properly cleaned and gutted. In spite of this, other cases occurred from eating scorpion-fish, trevally, parrot-fish, sea-bream, mullet, etc.

In his search for new factors likely to have rendered previously innocuous species poisonous, the doctor suggested metal as a possible cause. Indeed, enormous quantities of American war equipment had been thrown into the sea close inshore in 1945. It was believed that two years later it had deteriorated to an extent that the surrounding plankton and algae on which the suspected species fed, became permeated with toxic substances. The literature supporting this theory mentions metals containing copper, or nitro-cellulose in ammunition, as being the most dangerous element.

The poisoning of fish by manchineel berries, jellyfish or coral eaten by the fish has been suggested.

However, all these hypotheses have been rejected one by one. The various species of poisonous fish have different dwelling places and feeding habits. Ecology and toxicity do not seem to be inter-related. The same holds true for the possibility of bacterial origin, because of the difference between its symptoms and those of fish poisoning, nerve and sensory disturbances being more predominant than digestive disorders.

Research Scientist's Theory

According to Dr. Bruce W. Halstead, Professor of Medical Zoology at the Evangelical School of Tropical Medicine of Loma Linda, California, fish poisoning definitely originates in the diet of the fish, and research should be directed towards the analysis of stomach content. Dr. Halstead, who has been carrying out research for several years past in the Phoenix, Marshall, Caroline, and Marianas Island Groups, is of the opinion that by tracing back the stages of digestion of each species of fish, it is possible to arrive at the cause of toxicity; obviously a *primum movens* of vegetable origin.

Fish poisoning is perhaps caused by *Gonyaulax catenella*, the only plankton element that has been proved fatal for man. It has already been recognized as the cause of toxicity in mussels. It is particularly abundant along the coasts of the Pacific islands, forming long rusty-coloured trails on the sea. Fish, crabs and shell-fish are permeated with its poison, a more dangerous one than that of botulism.

For those readers who might wish to send samples to Dr. Halstead, here is the procedure to follow:

(1) *For Analysis:* put 0.3 ounces (minimum weight) of the flesh of the toxic animal in a bottle, and cover with the following solution:

Concentrated hydrochloric acid ..... 1 part
95° alcohol ..... 99 parts

(2) *For Identification:* place a fish exactly similar to the suspect in a container. This time use a 5% formalin solution for preservation.

In the course of laboratory experiment, Dr. Halstead has listed the poisonous and non-poisonous fish of those islands which he has visited. The chemical nature of the toxin is still unknown; it is neither protein, protamine nor alkaloid.

Japanese literature also covers the same subject (Tetraodons are responsible for the death of a hundred persons every year in Japan). Particular mention should be made of Dr. Yoshio Hiyama's work on the South Seas. He suggests a possible connection with the nematocysts of the polyps—a theory based on the predominance of poisonous species in the tropical belt and notably in the coral atoll groups.

Common Conclusions

An analysis of literature on the problem would occupy too much space here; reference can be made to more than a thousand books or papers. However, I quote below the few conclusions common to all authors (which as will be seen often coincide with popular beliefs):

—The maximum concentration of toxins is in the liver and intestines of the fish, but this is known to vary considerably according to locality and season.

—Fish of the same species may or may not be dangerous, according to their habitat.

—The swell-fish and barracuda are particularly poisonous during the spawning season.

—Drying does not affect the toxins. Some of them will survive a 20-minute boiling, and in certain cases are even rendered more deadly.

Research in this field has been neglected for too long. At a time when the world demand for fish is increasing and new fishing-grounds are being sought, the problem of poisonous fish attains an importance hitherto unsuspected by the natives of the South Seas. Experiments are in progress in California with a view to reducing the toxicity of certain species of Tetraodons by preservation. From the economic view, the bogey of fish poisoning will need to disappear before the fishing industry can be fully developed in the Pacific.

As regards medical protection, several Governments have published advisory handbooks intended mainly for the military forces stationed in these islands where tropical foods, especially the most dangerous ones, present an irresistible attraction.

The problem is no less important for those doctors concerned with native health. The islanders, indeed, on account of their diet, are frequently affected.

What advice can they be given in the present state of knowledge?

The species mentioned most often amongst the 300 reputed poisonous are the swell-fish (1 oz. of its flesh can kill a man within 20 minutes), box-fish, horned box-fish, moon-fish, porcupine fish, trigger-fish and barracuda whose characteristic shapes—often grotesque or terrifying—and gaudy colours are easily recognized, even by an inexperienced fisherman.

When it comes to avoiding poisonous fish belonging to the numerous edible species such as the Serranidae, trevally, king-mackerel, tuna, moray eel, sardine, lutjanidae, parrot-fish, etc., it is better to err on the side of caution rather than be guided by uncertain, and often faulty, knowledge.

In New Caledonia, the fisherman who nets a school of sardine is patient enough to sort out and throw away the blue-backed and pink-capped ones (*Clupea venenosa*).

Generally speaking, it is unwise to eat either the liver or the roe. In most cases poisonous fish is covered with rough

CORRESPONDENCE INVITED

The "SPC Quarterly Bulletin" is a magazine to serve the interests and needs of Pacific Islands people. Readers are cordially invited to contribute letters on topics of general interest to its columns. Photographs will also be welcomed (prints and/or negatives will be promptly returned after use).

Correspondence should be addressed to:

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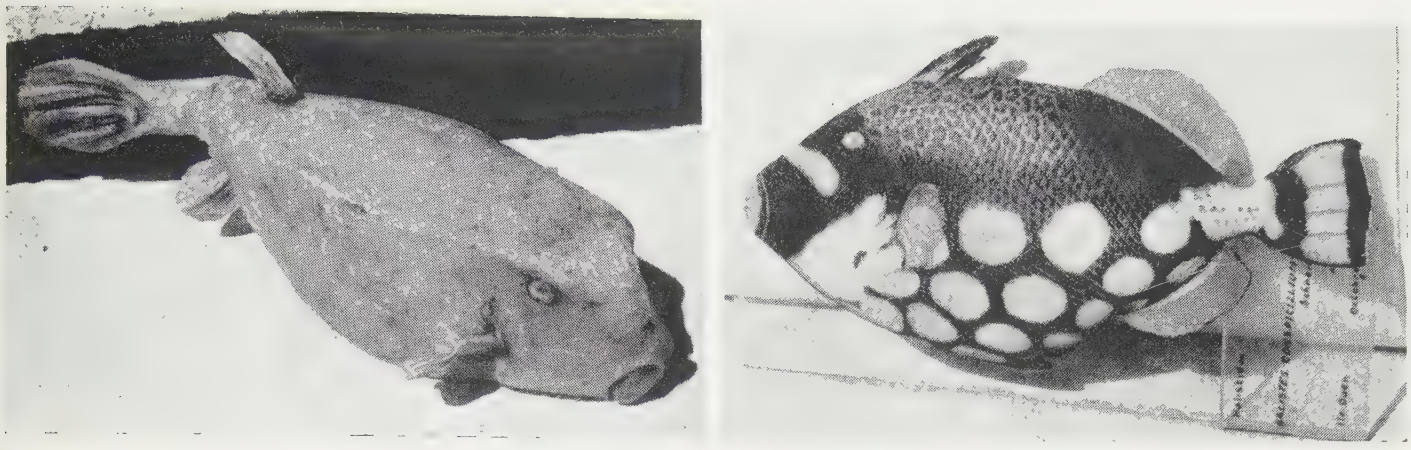


Among the commonest of poisonous fish found in Pacific waters are the box fish (left) and file, or trigger, fish (right).

spines or discs set side by side, rather than with thin overlapping scales; a beak similar to that of a tortoise is often found in place of the usual jaws and teeth.

Even when a fish offering every guarantee of safety is caught it is better to kill it immediately, remove the head and gills, and bleed, gut and wash it thoroughly. But it is no use salting or soaking the flesh of a doubtful fish in lemon for the purpose of destroying the poisonous substances. The fact must not be forgotten that putrid germs are not involved, and that therefore the freshness of the fish will only provide a minor hindrance to its pathogenic power.

In order to neutralize the toxic substances the natives of New Caledonia wrap the fish before cooking it in the broad leaves of a purple-blossomed liana growing by the shore. They also place a few young leaves inside it.

Cooking in itself does not destroy the toxins. In cases of absolute necessity (after a shipwreck, for instance) it would be preferable to eat the fish raw and unprepared without delay.

Another piece of advice is that if you wish to make use of your personal knowledge of fish to distinguish a poisonous species, do not trust the local terminology used by the inhabitants, since the same names may be applied to different fish in localities only a few miles apart.

What should you do if one day, in spite of these precautions, you fall ill through not daring to refuse the fish a friend brought you or because your host was not an experienced fish-eater? If a doctor can be consulted almost immediately he will treat the various symptoms by prescribing emetics, gastric lavages, purgatives, diuretics, physiological salt solution, cardiotonics, vitamin B complex, strychnine or atropin; morphine to kill the pain, calcium for the cramp.

Native Remedies

In remote villages, the inhabitants combat fish poisoning by the same methods as the doctor, making use of available medicines. Salt water will act as an emetic and purgative. As diuretics they use infusions of sour-sop, dittany, maize "beard", roots of sarsparilla or couch-grass. Rum is a handy stimulant (but is not recommended by doctors). It is sometimes taken with the addition of coconut milk, or roasted gombo beans are soaked in it. However, no personal opinion can be given on these recipes nor on the efficacy of melted pork-fat or broiled shark-flesh as antidotes.

In my own case the accepted European treatment, including the use of several new antihistamines, did not prove entirely satisfactory. I would have liked to have tested the curative powers of homeopathic drugs because of a certain clinical similarity with aconite poisoning, but none is available in Nouméa.

I insisted on trying the most popular remedy in all the Pacific islands: *Messerschmidia argentea,* Linné. I cannot say it hastened recovery appreciably. The decorative tree is commonly found growing on the shore. A handful of the velvety leaves is allowed to stand in boiling water, which is then boiled down to one-third of its original volume until a brownish, bitter liquid is obtained. Drunk ice-cold and sweetened with sugar, it is not unpleasant.

Some Micronesians prefer to chew the bark of the tree. In the Marianas, the dried leaves and bark are roasted before macerating. In the Marshalls, patients eat a mixture of raw leaves and crushed coral.

Experiments with *Messerschmidia argentea* on animals have not produced conclusive results.

Crushing the leaves of *Pithecolobium dulce,* a tree with thorny branches, produces a purgative liquid sometimes used to alleviate the effect of the poison.

In New Caledonia an infusion is used, made from some seven or eight roots of a wild lily growing along the river banks. If the dose is exceeded the patient suffers from extreme excitability.

Thus, empiric methods alone have not provided a decisive remedy for the symptoms of fish poisoning. Analysis of *Messerschmidia argentea* would probably make it possible to extract a useful palliative. On the other hand, it is interesting to note that after being poisoned by fish, several patients have recovered from rheumatic pains or oxyuriasis. During my attack the hay fever from which I had suffered almost daily for the past twenty years quite disappeared, but unfortunately this comforting recovery did not outlast the illness.

You may guess with what impatience I am waiting for the beneficial toxin to be chemically isolated. Others wait, too, with even far greater impatience than mine. Fish provides them with their daily requirements of proteins, and they know that sooner or later they are bound to suffer from poisoning; perhaps even die from it.

Surveys In Progress

Surveys are progressing in the region. They require the joint efforts of scientists in various fields (clinicians, ichthyologists, planktonologists, ecologists, pharmacologists, etc.), costly equipment and long-term research from which no positive results can be expected for many years to come. At the present time research workers are pursuing the following aims: the collection of information on the exact identity of poisonous fish and their usual distribution; the determination of the nature of the types of fish concerned; and the discovery of a method for rapid detection with possibilities of use on the fishing grounds.

Hitherto, the long-neglected problem of ichtyotoxism has mainly been presented in picturesque reports from our predecessors, the naval medical officers; now it has entered the field of scientific research.

Western Samoa Agricultural Census

Statistics obtained from an agricultural census of Western Samoa are analysed in this article.

By A. J. L. CATT

IN 1950 a sample survey of Western Samoan villages was carried out, as part of the world census of agriculture organized by the Food and Agricultural Organization. The information sought covered food consumption, crop acreages and yields, numbers of livestock, land use, and numbers of agricultural implements. The survey was conducted by Mr. J. V. White, then Field Economist in the New Zealand Department of Agriculture, assisted by two Samoan interpreters and a European officer. A European schoolteacher, after preliminary experience assisting in the survey of an Apia village, covered two distant villages.

To select the sample, the territory was divided into seven areas: Apia, where agriculture is much less important, and six others defined according to the production pattern of their export crops. From each of these regions, several villages were selected at random and complete censuses taken. In all, 22 villages were surveyed.

The technique adopted in collecting the information was for the enumerator to get the figures of population, agricultural implements, livestock, etc., from the *matai* (heads of families) in the village itself and then to visit the plantations to assess the areas under different crops, and count the trees. With the help of one of the interpreters who had some knowledge of areas and distances, it was found that an average village could be surveyed in about two days. Measurement of the main food crops taro and ta'amu; was not difficult as these were generally planted in small rectangular plots two sides of which could easily be "stepped out". But with some other crops, the mixed nature of the planting made measurement difficult. The area in trees was also difficult to assess owing to the rough nature of the terrain and the irregular shape of most blocks. It is estimated that the margin of error for the totals in the crop statistics is about 12.5 per cent., but a considerably higher error would be likely in the statistics for individual areas.

The census was conducted on a voluntary basis and co-operation by the Samoans was good to excellent. Misunderstandings did arise, however, in one or two cases, principally over the reasons for the survey and why some villages were included and others were not.

Similar information concerning non-village agriculture was obtained by means of questionnaires circulated to all planters, mission stations, and mission schools. Returns were not received from two of the mission stations and a few private planters.

The accompanying tables (Tables I-V) include the main statistics obtained by the survey. In addition, in Tables II and III some unofficial figures of value, total production and yields (calculated by the author of this article) are given. The latter figures are nothing more than broad approximation, and should not be interpreted too literally.

Table I: CROP AREAS

(*Acres*)

Crop	*Villages*	*New Zealand Reparation Estates (N.Z.R.E.)*	*Planters*	*Missions*	*Total*	*Percentage of total area under cultivation*	*Acres per Head*
	(*1*)	(*2*)	(*2*)	(*3*)			(*4*)
Coconut							
Bearing	32,882	7,492	1,281	153	41,808	51	.51
Non-bearing	3,160	253	4	68	3,485	5	.05
TOTAL	36,042	7,745	1,285	221	45,293	56	.56
Cocoa							
Bearing	6,855	1,567	2,471	74	10,967	14	.14
Non-bearing	1,171	283	329	12	1,795	2	.02
TOTAL	8,026	1,850	2,800	86	12,762	16	.16
Bananas							
Bearing	12,929	309	271	125	13,634	17	.17
Non-bearing	397	—	69	20	486	—	—
TOTAL	13,326	309	340	145	14,120	17	.17
Taro	4,643	—	55	105	4,803	6	.06
Minor Crops	4,214	—	142	113	4,469	5	.05
GRAND TOTAL	66,251	9,904	4,622	670	81,447	100	1

(1) Standard error of 12.5 per cent. (2) Error probably small. (3) These acreages are definitely under-estimates due to the failure of two missions to reply to the questionnaire. (4) Based on adjusted 1951 population census figures, i.e., about 82,500.

Table II: PRODUCTION

Crop	*Exports*		*Consumption*		*Total Production*	
	Volume (*1*) (*Tons*)	*Value* (*1*) (*£000*)	*Volume* (*2*) (*Tons*)	*Value* (*3*) (*£000*)	*Volume* (*4*) (*Tons*)	*Value* (*4*) (*£000*)
Coconut	14,657	605	3,761	155	18,418	760
Cocoa	1,880	400	657	140	2,537	540
Bananas	3,470	30	36,372	295	39,842	325
Taro	—	—	31,171	290	31,171	290
Minor Crops	—	—	22,374	210	22,374	210
TOTAL		1,035		1,070		2,105

(1) Official 1950 trade figures less adjustment for costs of preparing for shipment. Figures for coconut are for copra adjusted to include desiccated coconut at ratio copra to desiccated coconut — 33 : 25.
(2) Subject to considerable error. Coconut consumption reduced to copra equivalent.
(3) Coconut, cocoa and bananas valued at export prices less costs such as transport, handling, storage, etc.; taro and minor crops at arbitrary 1d. per lb.
(4) Sum of Exports and Consumption. Subject, therefore, to same errors.

Table III: YIELDS(1) PER ACRE IN BEARING

Crop	Volume of Exports per acre (lbs.)	Volume of Consumption per acre (lbs.)	Volume of Production per acre (lbs.)	Value of Exports per acre (2)	Value of Consumption per acre	Value of Production per acre
Coconuts	790	200	990	£14 10 0	£3 15 0(2)	£18 5 0
Cocoa	385	135	520	£36 10 0	£12 15 0(2)	£49 5 0
Bananas	570	5,970	6,550	£2 10 0	£26 0 0(2)	£28 10 0
Taro	—	14,600	14,600	—	£61 0 0(3)	£61 0 0
Minor Crops	—	11,200	11,200	—	£47 0 0(3)	£47 0 0

(1) Very approximate. (2) Valued at export prices less costs of preparing for shipment.
(3) Valued at arbitrary 1d. per lb.

Table IV:

NUMBERS OF LIVESTOCK

	Villages	N.Z.-R.E.	Planters	Missions
Cattle	(1)	9,295	404	663
Pigs	37,230	65	195	52
Horses	(1)	156	68	62
Fowls	104,573	—	1,118	380

(1) Sampling techniques not valid since some villages prohibited cattle and horses entirely. Even where this was not the case the numbers were very small.

Table V:

AGRICULTURAL IMPLEMENTS PER AVERAGE-SIZED VILLAGE

(i.e., of 400 people)

Axes	46
Spades	11
Shovels	12
Grubbers	6
Crowbars	27

Analysis of Tables

From the accompanying Tables I-V some interesting facts emerge:

(i) The land in use in Western Samoa is equivalent to about 1 acre per head of population. This is proportionately double the area under field crops in New Zealand, for example, but whereas the latter has 9 acres per head in sown pastures also, Western Samoa has virtually none.

(ii) About four-fifths of all land in production is village cultivated.

(iii) Easily the most important crop is the coconut, which is grown on over half of the cultivated land. However, it is significant that planters have more than half their land in cocoa.

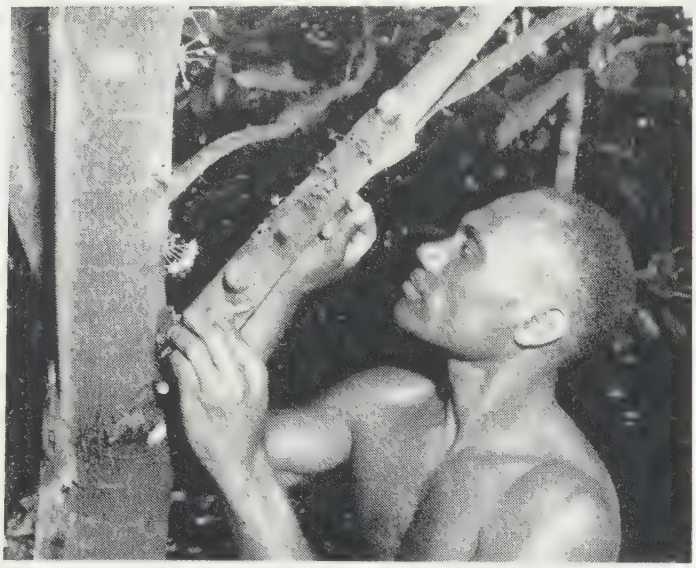
(iv) In terms of exports, cocoa gave easily the best return per acre. However, it has to be borne in mind that labour costs for cocoa are higher than for copra, while the differential would be greatly reduced if the system of running cattle on coconut plantations was adopted generally. This is done by the New Zealand Reparation Estates, which are able to graze over one beast to the acre. Not only is a return from the sale of beef obtained in this way, but also plantations are kept in better condition, making collection of the nuts easier and more complete. The low export figure for bananas was due mainly to the fact that the banana is grown primarily as a subsistence crop. In addition, a subsidiary reason was the shortage of shipping which obtained until 1953. From the consumption point of view, the best yields were from taro and similar purely subsistence crops. As an aside, it may be remarked that an error would appear to be the high consumption figure for cocoa, though how great the error is could only be established after a separate investigation.

(v) The lack of capital equipment employed in the villages is a serious hindrance to the adoption of better agricultural techniques. The *total* number of axes, spades, shovels, grubbers and crowbars is barely equal to the number of able-bodied men in the villages. No mention of the number of tractors is made in the report, but the figure for mid-1952 was 10. Even allowing for the fact that the rocky nature of the Samoan soil limits the usefulness of tractors and such like machinery, the smallness of their number is significant for they have other uses in addition to tillage. In Samoa even horses are little used to supplement human labour.

In conclusion, it is emphasized that the results of this survey should be used with caution. First, there are the difficulties of measurement, etc., already mentioned; secondly, the survey was made during a short period of the year so that seasonal changes could not easily be allowed for; and thirdly, the census relates to only one year and no allowances for abnormalities such as droughts, etc., could be made. Despite these limitations, however, the results of the survey are of great value, for they shed light on points where no information was previously available, and they supplement data already at hand.

When related to the population increase in Samoa, the results of this census suggest the necessity for a comprehensive and regular collection of agricultural statistics. In no other way can trends in production and consumption be measured nor an assessment be made of the potential production of the Territory.

A typical Samoan village—Aufaga, on the south coast of Upolu. The south coast of Samoa which has a higher rainfall than the north, grows mainly coconuts and bananas; very little cocoa



Cocoa propagation at the Administration's agricultural station at Keravat. ABOVE: Hand pollination being carried out by a native agricultural assistant. A special cover is placed over the cocoa buds 24 hours before they open, and is replaced after hand pollination to prevent pollination by insects. The flowers can be seen both on the main trunk and the branch. Hand pollination is done only on special "mother" trees utilized in cocoa breeding and cross-breeding experiments. RIGHT: Cocoa cuttings in propagating boxes. In general, all commercial cocoa is grown from seed; propagation from cuttings done at Keravat is limited to cross-breeding and research work.

Cocoa A Profitable Crop In Papua And New Guinea

Those planning to grow cocoa in Papua and New Guinea will be interested in this review of a detailed analysis of present prospects there for this crop, prepared by . . .

F. C. HENDERSON*

"CACAO has better long-term market prospects than any other crop suitable for Territory conditions. World production of cocoa has not increased since the War; however, the world's population has, and in the West, full employment and rising living standards have increased the potential market. The production lag is due to disease in West Africa and to economic and political factors in the various producing areas. Manufacturers believe that, given reasonably priced cocoa, they could place one million tons per year. Since the War, world production has varied between 650,000-740,000 tons. There has been no carryover from season to season for some time, hence, with no back lag, prices respond rapidly to each crop forecast issued from the main producing centres."

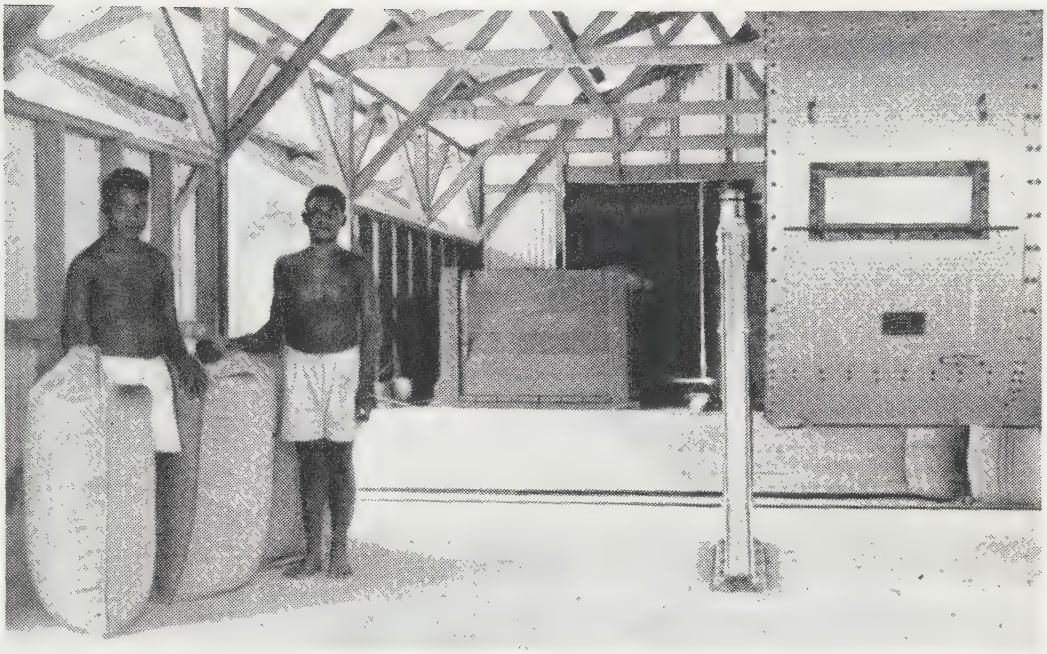
This brief introduction to an article on cacao as a crop for the owner-manager in Papua and New Guinea, which appears in *The Papua and New Guinea Agricultural Journal* for October, 1954, indicates why the world shortage of raw cocoa has greatly intensified interest in its expansion in that territory.

This excellent article, illustrated with photographs and line drawings, is addressed to those who intend becoming owner-managers of a cacao property in Papua and New Guinea and is based on questions frequently put to the Department of Agriculture by intending settlers and planters. In it the author, Mr. F. C. Henderson, covers in a simple and practical way the various aspects connected with cocoa growing, with particular reference to conditions and experience in that territory—clearing of virgin bush, lining, holing, establishment of shade, planting, selection of seed, inter-planting among mature coconut palms, planting grassland, plantation management, intercropping, shade manipulation, pruning, rejuvenation, pests and diseases, and harvesting.

Under "Preparation for Market", Mr. Henderson deals with the processing of the crop, the construction of fermenting boxes and the layout of a cacao fermentary (with diagrams), the ferment, driers, including sun and sliding-roof sun driers (with diagram), hot-air and kiln driers, the hot floor and mechanical driers, the drying process and marketing.

Under the latter, helpful indications are given of the desirable features sought by manufacturers, the minimum requirements for Accra No. 1 grade cocoa and the chief defects of New Guinea beans listed by Australian manufacturers. (The last are mainly due to faulty processing

* Mr. Henderson is Chief of the Division of Plant Industry, Department of Agriculture, Stock and Fisheries, Administration of Papua and New Guinea.



Interior view of a cacao bean fermentary designed by Mr. Henderson, who supplies constructional details in his article. The same building houses a rotary drier, with bagging space.

and preparation for market and can be readily corrected by the grower paying more attention to processing and storage on the plantation).

Mr. Henderson considers the optimum cacao area for an owner-manager to be between 250 and 300, with the planting of 150 acres in the first two years as probably a satisfactory compromise between the minimum and optimum area to aim at in the initial planting. A detailed budget for 150 acres is given as an indication of capital requirements, running expenses and probable returns. Allowing for labour, living expenses of owner-manager, house and furniture, labour quarters and store buildings, drier/fermentary, tools, transport and expenses, rent, insurance, and interest on capital at 4½%, the total indebtedness at the end of the fourth year is estimated at £A23,217.

Running expenses in full bearing (labour, owner-manager supervision, transport expenses, building maintenance, stores and supplies, tools, administration, insurance, amortisation of capital over 10 years and interest) amount to £A.9,793, or approximately £A.200 per ton.

The following indications are given of possible returns:

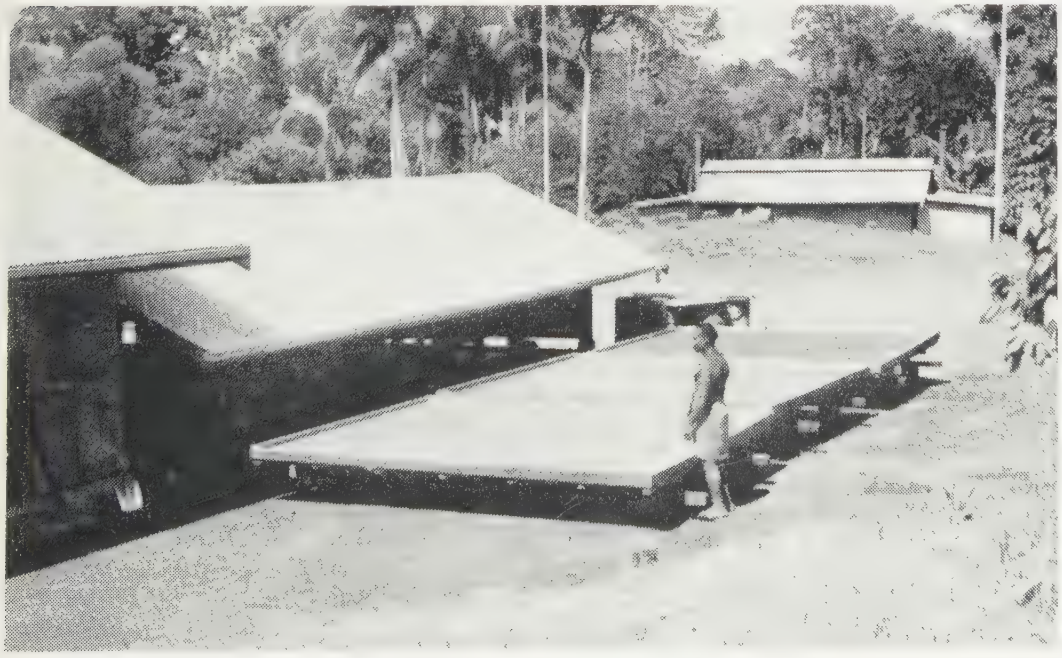
At £A.300 per ton in plantation store £A.15,000

At £A.250 per ton in plantation store £A.12,250

The initial establishment costs would be fully amortised fifteen years from the commencement.

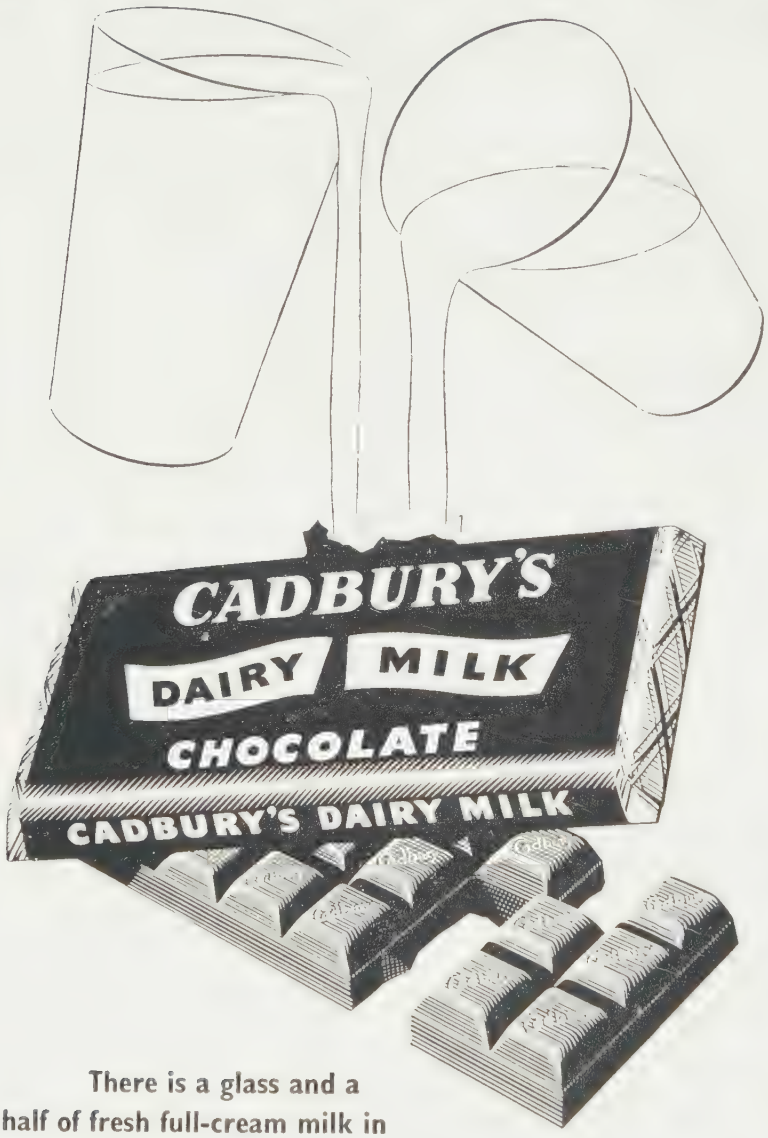
Although directed to Papua and New Guinea conditions, other territories interested in cocoa growing should find much of interest in Mr. Henderson's article, which is to be followed in future issues of *The Papua and New Guinea Agricultural Journal* by others of a more technical nature by specialist officers.

—*E.N.K.*



A simple sun drier is shown in this illustration from the article under review. According to the author, the simplest and cheapest type of sun drier consists of a long, narrow fixed roof of iron or thatch under which are run bamboo or wooden trays. The sides of the building are open, and the trays from oposite sides are at different levels so that one slides under the other into the shelter.

The sign of good chocolate



There is a glass and a half of fresh full-cream milk in every half-pound of Cadbury's Dairy Milk Chocolate. Over the years, this famous Cadbury identification has symbolised the world's finest chocolate.

CADBURY'S

BY MOUNTAIN AND SEA, CLAREMONT, TASMANIA

MD102/43/5

Economic Survey of Cook Islands

AN economic survey is being made of the Cook Islands for the New Zealand Government, primarily to indicate possible lines of development in such fields as agricultural production and secondary industry, fiscal policy, and transport. It is being carried out by Professor H. Belshaw, Professor of Economics at Victoria University College, Wellington, and Mr. V. D. Stace, Assistant Economist to the Reserve Bank of New Zealand, both of whom visited the Group last May to carry out preliminary studies.

Professor Belshaw and Mr. Stace have had wide experience in under-developed territories. Professor Belshaw is a past International Research Secretary to the Institute of Pacific Relations, a former economic consultant to the Economic Commission for Asia and the Far East, and a one-time director of the Rural Welfare Division of the United Nations Food and Agricultural Organization. In 1951-52 he was Chairman of the United Nations Mission on Community Organization in South and South East Asia. Since his return to New Zealand he has been appointed a consultant on community development to the South Pacific Commission, and is presently engaged in advising the Government of American Samoa on economic development.

Mr. Stace is well known in the Pacific Islands for his work on South Pacific Commission projects relating to the economic development of the area.* He recently completed an economic stock-taking of the Trust Territory of Western Samoa.

* Mr. Stace is author of SPC Technical Paper No. 54, **The Pacific Islander and Modern Commerce.**

Cocoa in the Central Pacific

THE 300-acre cacao project being developed in Babeldaub, Western Caroline Islands, is a further example of the ever-growing interest being taken in the region, in the cultivation of cocoa as a commercial crop.

Planting at Babeldaub is being made primarily in sheltered river valleys in virgin jungle areas, and 180 acres of an excellent Criollo type cacao have been planted. The oldest planting, of about 80 acres, is now two years old and is beginning to flower. By the end of the next planting season, a further 120 acres will have been planted. A sawmill in operation at the project provides lumber, and workers' barracks, machine shops, equipment storage and managers' quarters have been completed.

Another interesting development in this U.S.-administered Trust Territory of the Pacific Islands is a 3,000-tree experimental planting of Criollo type cacao, interplanted with coconuts at Ponape, which will be in production this year. It is hoped to obtain valuable information from this experiment.

Breadfruit cooked in a hot stone oven in Tahiti, where it was a staple food long before the advent of the European. It appears the species had its origin in Indonesia, perhaps also in New Guinea, where large natural stands are found

Plant Introduction In Tahiti

By CARLOS GARCIA-PALACIOS

THE tropical vegetation of Tahiti which arouses the admiration of visitors is not of spontaneous growth as one might be led to believe, but is largely the result of the efforts of man and the numerous importations made by Europeans and islanders.

The first travellers possibly noticed, as soon as they arrived in the island, that the vegetation was new and contained certain well-represented plants which unfortunately had little economic value. Thus the human migration of Polynesians and Europeans, who both imported planting material, was followed by plant migrations. The evidence of these imports is very obvious in Tahiti's ancient history.

However, importation and introduction of plants on a large scale really began to assume importance with the arrival of the first white man, since even Captain Cook is said to have introduced the orange tree.

A complete catalogue of species introduced by Europeans would necessarily comprise three main parts. Firstly, Buttaud's writings (1891), a work at present unobtainable and of which only poor typewritten copies are available, would need to be searched for information. Then, the works of Lanessan (1886), Nadaud (1864-1899) and Cuzent (1857-1861) would require study. Finally, Drake's excellent work, which gives a complete catalogue of the island's endemic species, would require examination.

Almost all the more recent introductions have been mentioned in the *Journal of the Tahiti Chamber of Agriculture* since the beginning of this century. The personal archives of Mr. Harrison Smith are also extremely valuable, since he was one of the greatest importers of planting material—if not the greatest—during the years 1925 to 1945.*

Mr. Harrison Smith was both a great traveller and a confirmed botanist. While living in Tahiti he constantly had plants sent from all parts of the world, and Mutuovini certainly comprises the finest collection of tropical plants existing in these areas of the South Pacific.

The number of species maintained and acclimatized at Mutovini was as high as 300 in 1953. Unfortunately, the property was neglected between Mr. Harrison Smith's death and the arrival of Mr. Schoenburg four or five years ago. To-day, around ten workmen are employed there full-time.

Last year, with the close and constant co-operation of the Tahiti Department

* Mr. Harrison Smith was the first owner of the famous Mutuovini Estate, Tahiti's real tropical botanical garden. This estate now belongs to Mr. Crane, an American citizen, and is managed most competently and actively by Mr. Schoenburg. The Mutuovini property includes an estate in the mountains which provides excellent ground for raising cattle.

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of Agriculture, a new start was made on the complicated and difficult task of labelling the collections. This task is now completed.

For some years now the Tahiti Department of Agriculture has been importing less spectacular planting material, mainly grasses and legumes, to establish cover vegetation suitable for the various soils under cultivation (improving plants) and to increase the pasture acreage.

Among plants which are of economic importance, but which are neither grasses nor legumes, it should be mentioned that trials are at the present time being carried out in Tahiti on the pepper tree, on the aleurites (tung oil) and on the candleberry tree, which is, however, of little economic value.

On the subject of valuable plant introductions mention should be made of those introduced by the Raoul Garden at Papeete and the Agricultural Station of Pirae, also situated near Papeete.

The Tahiti Agricultural Department was established in 1948. While at present there is no official experimental garden as such, there do exist experimental nurseries in the Agricultural Stations on the island, one at Pirae and the other at Taravao, situated between 1,300 feet and 2,600 feet above sea-level. Here upland crops are grown for observation.

The Government has ordered a number of pepper cuttings, a high yielding crop, in accordance with the wishes of planters who would like to see it introduced into the territory.

The Government of French Oceania also hopes that agriculture will assume its correct place in the economy of the territory, and with this end in view it intends to study and multiply supplementary crops adapted to the Tahitian soil, to engage in pest control schemes, and to educate and give guidance to native farmers. Instructors will be trained and their services made available to the islanders and the European planters. Finally, three agricultural subdivisions are to be opened in the Leeward, Marquesa and Austral Islands.

The Tahiti Department of Agriculture has planted 11,000 citrus seedlings in its nurseries (of which 4,000 have already been distributed to individuals), 7,500 fruit tree seedlings (of which 3,100 have been distributed), 30,000 cinchona seedlings, 60,000 coffee seedlings and 33,000 seedlings of various trees (of which 18,000 have already been distributed).

Of the crops capable of greatest development, copra deserves first consideration, since the shoreline of Tahiti is more or less entirely planted with coconut palms. The same is true for the Low Islands (Tuamotu). Their plantations are relatively young and are in full production. However, certain atolls have not yet been planted, perhaps because of labour shortage, and several

might easily accommodate new plantations.

As for fruit production, the grapefruit is holding the Government's attention, in view of its promising future. Already, export abroad is being considered, and orders will certainly exceed production once this produce has become known.

The orange tree might also undergo regeneration in Tahiti and most of the High Islands, provided an effort is made to carry out new planting in the form of extensive orchards, properly adapted to possible fungicide treatment, and that the most is made of the private lands on Fatu Hiva in the Marquesas, as yet untouched by any parasitic disease. This area might subsequently serve as a nursery for the whole of the territory.

Coffee, in which the native population is beginning to show increasing interest, might rapidly become one of the main resources of the country's economy since the only coffee grown, the arabica variety, is highly valued abroad, being considered the best in the world.

Cinchona, which is actively grown, also holds the Government's attention, and press and radio campaigns are beginning to bear fruit. Maps of the various islands are at present being established to determine the best areas for cultivation between 1,000 and 2,500 feet, and requests for seedlings are already beginning to come in. The same is true of cocoa, which, however, requires a fairly large effort in view of the fact that cocoa plantations have to be built up from nothing.

Rice is little grown; virtually, only on the island of Moorea, where only 12 acres are cultivated.

Vanilla is also grown fairly regularly, despite frequent price fluctuations. The Government's efforts are at present mainly directed towards improving quality.

Finally, pepper and derris are two new crops in Tahiti with high promise. However, both are still at the trial stage.

To conclude, it is interesting to consider that Tahiti's vegetation could have been described as poor at the time when the first white men arrived. It has reached its present stage of development and gives hope of an even finer future, thanks to the efforts and enthusiasm of men who realized that this island contains all the characteristics necessary for becoming perhaps some day the botanical garden of the South Seas.

PICTURE CREDITS

Acknowledgment is made for photographs in this issue, as follows: Pp. 9 (lower), 11, 12, 21, 34, 35; Australian Official Photos; p. 10, University of Hawaii photo; pp. 25, 26, 27, Netherlands Information Service; pp. 29, 31, French Institute of Oceania; p., 37, A. Sylvain, Papeete.

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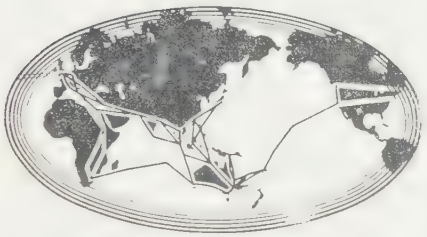

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Collection and Preservation of Pacific Island Manuscripts

THE manuscripts listed below have been located and microfilmed by the Commission since the last Deposit Notice appeared in the *Quarterly Bulletin* for October last year. Copies of each have been deposited in the appropriate library nominated by member governments, while other copies are available for purchase by research workers, librarians and others at the prices stated. A full description of this Commission service was published on p. 31 of the *Quarterly Bulletin* for July, 1954.

Deposit Notices Nos. 49-60

The following manuscripts have been made available for deposit and reproduction by kind permission of M. J Guiart, Enthnologist of the Institut Français d'Océanie, Noumea. The originals remain in M. Guiart's possession.

No. 49

Records of mission stations in New Caledonia. Kept by the Protestant Mission of New Caledonia during the period 1926-1937. 189 pp. In French.

No. 50

Records of a Conference of Protestant Mission Native Pastors held at Bonè, New Caledonia in 1908. 88 pp. In French

No. 51

Records of a Conference of Protestant Mission Native Pastors held at Houialou, New Caledonia, in 1925-31. 70 pp. In French.

No. 52

Records of a Conference of Protestant Mission Native Pastors held at Khuine, New Caledonia, 1912. 50 pp In French.

Note: This record was kept by Pastor Maurice Leenhardt.

No. 53

Records of Conferences of Protestant Mission Native Pastors held at Khuine, ew Caledonia, in the year 1926, 1928 and 1929. 117 pp. In French

No. 54

Report of a Conference of Protestant Mission Native Pastors, held at Tendo, New Caledonia, 1920. 68 pp. In French

No. 55

LEENHARDT, R. Esquisse de l'Histoire politique et réligieuse des Iles Loyauté de 1840 à 1895. Le rencontre de la colonisation et des Missions. 262 pp., bibl., 1930.

Note: This was Prof Leenhardt's thesis presented to the Faculty of Protestant Theology, Paris.

No. 56

A French-Iai (Loyalty Islands) Word List compiled by M. J. Guiart. 40 pp.

No. 57

A French-Olal (New Hebrides) Word List compiled by M. J. Guiart. 119 pp.

No. 58

A French-Dubea (New Caledonia) Word List compiled by M. J. Guiart. 61 pp.

No. 59

A French-Venan (New Hebrides) Word List compiled by M. J. Guiart. 77 pp.

No. 60

A French-Craig Cove (New Hebrides) Word List compiled by M. J. Guiart. 85 pp.

Deposit Notice No. 61

The following manuscript has been made available for deposit and reproduction by kind permission of the Director of the Auckland Institute and Museum, New Zealand. An original of the dictionary is in the custody of the Museum.

FOX, C. E. A Lau (British Solomon Islands)-English Dictionary, 1950. 328 pp. Typescript.

Deposit Notice No. 62

The following papers have been made available for deposit and reproduction by kind permission of W. M-J. Dubois of Maré, New Caledonia. The originals remain in M. Dubois' custody.

Papers relating to Maré, New Caledonia, including vocabularies in the Nengone Language and an ethnology of Maré by M-J. Duboic. 467 pp.

Deposit Notice No. 63

The following manuscript has been made available for deposit and reproduction by Mr. G. K. Roth, Secretary for Fijian Affairs, Suva, Fiji. An original copy of the manuscript is held by the South Pacific Commission.

BREWSTER, A. B. Genealogies and histories of the Manititu or tribal governments of Central Viti Levu (Great Fiji). 150 pp. map. *Ts.* 1923.

Note: Mr. Brewster was at one time Commissioner Colo North and East Provinces, Fiji.

Deposit Notices Nos. 64-68

The following manuscripts have been made available for deposit and reproduction by Dr. A. Capell, Reader in Oceanic Languages, University of Sydney. The originals remain in Dr. Capell's custody.

No. 64

A preliminary Maré (Nengone) and English dictionary compiled from a Concordance to the Maré New Testament by Dr. A. Capell. Sydney, 1925. 30 pp.

No. 65

PATON, F. H. L. English and Lenakel dictionary. 49 pp.

No. 66

CAPELL, A. A grammar of the Eromangan language. 1928. 94 pp.

No. 67

CAPELL, A. An Eromangan comparative dictionary. 117 pp.

No. 68

MUKAWA and English Dictionary (with addition of Gapapaiwa) *and* a grammar and dictionary of the Mukawa language, with Gapapaiwa equivalents. Revised from the ms. of Rev. Eric Giblin. Sydney, 1923. Ts. xvii. 73 pp.

Deposit Notice No. 69

The following manuscript has been made available for reproduction and deposit by kind permission of the Director of the Auckland Institute and Museum, New Zealand. An original of the dictionary is in the custody of the Museum.

FOX, C. E. A Ngella-English Dictionary, 1955. ii. 406 pp.

Deposit Notice No. 70

The following manuscript has been made available for reproduction and deposit by M. J. Guiart, Ethnologist of the Institut Français d'Océanie, Noumea. The original remains in M. Guiart's possession.

GUIART, J. A vocabulary of the Kilene dialect as spoken at Sag-Sag, New Britain. 30 pp.

HOW TO OBTAIN COPIES OF THE ABOVE ITEMS

Microfilm positives of the above listed items may be obtained at the following costs from the Executive Officer for Social Development, Box 5254, G.P.O., Sydney, N.S.W.: No. 49, 9/- (Aust); No. 50, 4/6; No. 51, 3/9; No. 52, 2/3; No. 53, 5/3; No. 54, 3/6; No. 55, 26/-; No. 56, 2/6; No. 57, 11/-; No. 58, 3/6; No. 59, 4/6; No. 60, 10/-; No. 61, 19/-; No. 62, 45/-; No. 63, 10/-; No. 64, 2/-; No. 65, 3/3; No. 66, 6/-; No. 67, 7/-; No. 68, 5/6; No. 69, 23/-; No. 70, 2/-.

Note.

In Deposit Notice No. 40 which appeared in the October, 1954, *Quarterly Bulletin*, it was stated that the manuscript by Latham was understood to be a thesis presented at Melbourne University. Dr. J. S. Cumpston, the Australian Consul at Noumea, has kindly advised that the thesis was prepared by Mr. Latham in the 3rd year of his Honours Course for the B.A. Degree in the School of History and Political Science at Melbourne University. It was completed in 1929, and a copy is held by the Department of External Affairs in Canberra.

QUARTERLY READING LIST No. 16

A bibliography of publications relating to social development in the South Pacific.

THIS Reading List represents an attempt to note every item to appear in the field of social development in the South Pacific during the quarter; the entries are drawn from over 100 periodicals which are regularly examined, as well as from bibliographies, publishers' notices and similar material. Publications of the South Pacific Commission have not been indexed. Items marked with an asterisk have not been seen in the Social Development Section. The Executive Officer for Social Development, G.P.O. Box 5254, Sydney, will be glad to obtain for any metropolitan or territorial government, copies of items listed.

SOUTH PACIFIC — GENERAL

Anthropology

(1) ELKIN, A. P.: Stanner's "The South Seas in Transition": a review. *Oceania,* vol. 26, no. 1, September, 1955. pp 76-77.

(2) van LIJF, J. M.: Stanner's "South Seas in Transition": a review *Tropical Abstracts,* vol. 10, no. 8, 23rd April, 1955. pp. 286-288.

(3) SPOEHR, A.: Human background of Pacific Science. *The Scientific Monthly,* vol. 81, no. 1, July, 1955. pp. 3-9.
The relationship of contemporary science to the changing Pacific scene.

Bibliography

(4) O'REILLY, P.: Bibliographie de l'Océanie, 1953. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 231-263.
A comprehensive bibliography, arranged by subjects, including such topics as Geography; Anthropology; Missionary Activities; History; Government and Administration; and Art and Literature.

Biography

(5) In Memoriam: Maurice Leenhardt. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 4-8, illus.
Includes a bibliography of Dr. Leenhardt's publications on New Caledonia.

(6) POIRIER, J. *and others*: Maurice Leenhardt. L'homme et son ouvrage. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 5-76.
Includes sections on Leenhardt as a missionary, a linguist and an anthropologist.

Co-operation and Co-operatives

(7) MAUDE, H. E.: Co-operative movements in the territories within the area of the South Pacific Commission. *In HORACE PLUNKETT FOUNDATION.* Year Book of Agricultural Co-operation, 1955. Oxford, Blackwell, 1955. pp. 10-18.

History

(8) COTTEZ, J.: Une expédition militaire Suédoise dans le Pacifique au XVIIIe siècle. *Bulletin de la Société d'Etudes Océaniennes,* vol. 8, no. 100, September, 1952. pp. 425-453; vol. 9, no. 110, March, 1955. pp. 374-381.

(9) NEWBURY, C.: Koskinen's "Missionary influence as a political factor in the Pacific islands": a review. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 214-216.

(10) SKELTON, R. A.: Explorers' Maps. VIII. The Spanish in the Pacific. *Geographical Magazine,* vol. 27, no. 11, March, 1955. pp. 543-556, illus; IX. The Dutch conquest of the South Land in the 17th Century, vol. 28, no. 1, May, 1955. pp. 28-39, illus. X. James Cook and the Mapping of the Pacific, vol. 28, no. 2, June, 1955. pp. 95-106, illus. A series of articles by the Superintendent of the British Museum Map Room presenting some episodes in the history of exploration for which the evidence of maps is especially interesting.

MELANESIA

Anthropology

(11) van EMST, P.: Geld in Melanesie. De functie van het monetaire element in een primitieve maatschappij. Amsterdam, J de Swart, 1954*

(12) HUGHES, E. C.: Elkin's "Social anthropology in Melanesia": a review *American Journal of Sociology,* vol. 61, no 1, July, 1955. pp. 85-86.

(13) LAND, C.: van Emst's "Geld in Melanesie": a review. *Tijschrift Nieuw-Guinea,* vol. 16, no. 1, May, 1955. pp. 24-28.

(14) LAND, C: Elkin's "Social anthropology in Melanesia": a review. *Tijdschrift Nieuw-Guinea,* vol. 15, no. 6, March, 1955. pp. 188-190.

(15) REED, S. W.: Elkin's "Social Anthropology in Melanesia": a review. *Pacific Affairs,* vol. 28, no. 2, June, 1955. pp. 193-194.

(16) SCHLESIER, E.: Elkin's "Social anthropology in Melanesia": a review. *Zeitschrift fur Ethnologie,* vol. 79, no. 2, 1954. pp. 309-311.

POLYNESIA

Anthropology

(17) BARNETT, H. G.: Keesing's "Social anthropology in Polynesia" and Elkin's "Social anthropology in Melanesia": a review. *American Anthropologist,* vol. 57, no. 2, part 1, April, 1955 pp. 354-357.

(18) BURROWS, W.: Palolo. *Journal of the Polynesian Society,* vol. 64, no. 1, March, 1955. pp. 137-154.

(19) HYE-KERKDAL, K: The secret of the jumping stick. *Journal of the Polynesian Society,* vol. 64, no. 1, March, 1955. pp. 35-43.

(20) LINDSAY, H. A.: Kon Tiki theory a Mare's Nest! *Walkabout,* vol. 21, no. 7, July, 1955. pp. 35-36, map.

Archaeology

(21) EMORY, K.: Un programme d'archéologie polynésienne. *Bulletin de la Société d'Etudes Océaniennes,* vol. 9, no. 110, March, 1955. pp. 382-387. Translated and republished from the *American Anthropologist,* December, 1953.

Linguistics

(22) DYEN, I.: The proto-malayo-polynesian laryngeals. Baltimore, Linguistic Society of America, 1953. vii. 65 pp. (William Dwight Whitney Linguistic Series.)

(23) HAUDRICOURT, A. G.: Les origines asiatiques des langues malayo-polynésiennes. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 180-183.

SOUTH PACIFIC COMMISSION

(24) NILLES, J.: Thomson's "A survey of community development": a review. *Anthropos,* vol. 50, nos. 1-3, 1955. pp. 485-486.

(25) South Pacific Commission. *International Organization,* vol. 9, no. 1, February, 1955. pp. 191-193. Recent activities of the Commission.

BRITISH SOLOMON ISLANDS

Anthropology

(26) FIRTH, R.: Privilege ceremonials in Tikopia: a further note. *Oceania,* vol. 26, no. 1, September, 1955. pp. 1-13.

COOK ISLANDS

History

(27) Enforcing the law: past and present. *Cook Islands Review,* vol. 1, no. 7, June, 1955. p. 4.

(28) The land question in the Cook Islands. *Cook Islands Review,* vol. 1, no. 7, June, 1955. pp. 5-6.

(29) The Maori and his land: a page from the past. *Cook Islands Review,* vol. 1, no. 6, May, 1955, p. 6. A declaration made by "the Parliament of the Cook Islands Federation" in 1894 regarding the ownership and use of land.

FIJI

Anthropology

(30) CATO, A. C.: Fiji and Fiji-Indians: a culture contact problem in the South Pacific. *Oceania,* vol. 26, no. 1, September, 1955. pp. 14-34.

(31) NAYACAKALOU, R. R.: The Fijian system of kinship and marriage. *Journal of the Polynesian Society,* vol. 64, no. 1, March, 1955. pp. 44-55.

(32) O'REILLY, P.: Abri sous roche à gravures, Nailou, district de Cakaudrove, Vanua Levu, iles Fidji. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 178-179, illus.

Community Development

(33) McAULEY, J: Hayden's "Moturiki: a pilot project in community development": a review. *Australian Outlook,* vol. 9, no. 1, March, 1955. pp. 65-66.

Co-operation and Co-operatives

(34) Fiji. *In HORACE PLUNKETT FOUNDATION.* Year Book of Agricultural Co-operation, 1955. Oxford, Blackwell, 1955. pp. 336-339. Recent developments in the Territory.

Development

(35) LUKE, H.: Paradox in the Pacific. *New Commonwealth,* vol. 28, no. 2, January 10th, 1955. pp. 36-38. Reprinted in *South Pacific,* March, 1955.

GILBERT AND ELLICE ISLANDS

Co-operation and Co-operatives

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NEW CALEDONIA

Anthropology

(37) CHEVALIER, L.: Essai de bibliographie à l'usage de l'ethnologie historique de la Nouvelle-Calédonie. *Etudes Mélanésiennes,* vol. 4, no. 6, September, 1952. pp. 90-92; vol. 6, no. 8, December, 1954. p. 120.

(38) DUBOIS, M. J.: Les classes d'age à Maré au temps de paganisme. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 43-55.

(39) KOOPTZOFF, O. *and* WALSH, R. J.: Blood groups of New Caledonian natives. *Oceania,* vol. 26, no. 1, September, 1955. pp. 35-41

(40) LAROCHE, M. C.: La vie dans les tribus calédoniennes en 1954. Notes pour une enthnologie de l'acculturation. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 77-90, illus.

(41) LEENHARDT, R. H.: Les iles Loyalty. *Encyclopédie Mensuelle d'Outre Mer,* no. 55, March, 1955. pp. 135-138.

(42) LEENHARDT, M.: Le masque et le mythe en Nouvelle-Calédonie. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 9-20.

(43) NAISSELINE, H.: Histoire mythique de l'île de Maré. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 34-42.

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(44) Deux sejours de Victor Segalen, à Nouméa, voici cinquante ans. Lettres inédites. *Bulletin de la Société des Océanistes,* vol. 10, No. 10, December, 1954. pp. 185-191.

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(46) Les "Messageries Maritimes" et la Nouvelle-Calédonie. *Journal de la Société des Océanistes,* vol. 10, no. 10, December, 1954. pp. 183-184.

Land Tenure

(47) Ensemble des textes législatifs relatifs à da propriété indigène des terres. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 66-91.

Linguistics

(48) LENORMAND, M. H.: La phonologie du mot en lifou, iles Loyauté. *Journal de la*

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NEW HEBRIDES

Anthropology

(49) ANTHONIOZ, P.: Une ascension au pic Santo. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 96-102.

(50) ANTHONIOZ, P.: La danse du Gaul, cérémonie rituelle de l'Ile de Pentecôte, Nouvelles-Hebrides. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 92-95, illus.

(51) ILO, P.: Réalisations faites par des indigènes non éduqués en vue d'un début de développement économique des Nouvelles-Hébrides. *Etudes Mélanésiennes,* vol. 6, no. 8, December, 1954. pp. 103-108.

NETHERLANDS NEW GUINEA

General

(52) FEUILLETAU de BRUIJN, W. K.: Klein's "Nieuw-Guinea", vol. II: a review. *Tijdschrift Nieuw-Guinea,* vol. 15, no. 6, March, 1955. pp. 185-188.

Anthropology

(53) BOELEN, K. W.: Begrippen "Stam" en "Tuma" (Clan) bij de Ekagi's. *Tijdschrift Nieuw-Guinea,* vol. 16, no. 1, May, 1955. pp. 1-6.

(54) HAAN, R.: Het varkensfeest zoals het plaatsvindt in het gebied van de mivieren Kao, Muju en Mandobo (Ned. Nieuw-Guinea). *Inleiding tot Taal-Land—en Volkenkunde,* vol. III, no. 1, 1955. pp. 92-106*.

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(57) KROEF, J. M. van der: Western New Guinea: a bibliographical note. *United Asia,* vol. 6, no. 6, December, 1954. pp. 277-284.

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(58) LESSA, W. A.: van Baal's "The Nimboran Community development project" (S.P.C. Technical Paper No. 45): a review. *American Anthropologist,* vol. 57, no. 2, part 1, April, 1955. pp. 381-382.

Government and Administration

(59) West New Guinea. *United Nations Review,* February, 1955. pp. 24-62.

Linguistics

(60) COWAN, H. K.: Notes on Windesi grammar. *Oceania,* vol. 26, no. 1, September, 1955. pp. 42-58.

(61) COWAN, H. K.: Voorlopige resultaten van een ambtelijk taalonderzoek in Nieuw-Guinea. s'Gravenhage, Nijhoff, 1953. 50 pp., maps.

Missions

(62) KAMMA, F. C.: *editor.* Kruis en Korwarr: een honderdjarig waagstuk op Nieuw-Guinea. Den Haag, Voorhoeve, 1954. 235 pp. A symposium on missionary enterprise in Netherlands New Guinea during the last century.

PAPUA AND NEW GUINEA

Anthropology

(63) BODROGI, T.: Some notes on the ethnography of New Guinea. Initiation rites and ghost cults in the Astrolabe Bay area. *Acta Ethnographica Academiae Scientiarum Hungaricae,* no. 3, 1953. pp. 91-184.

(64) ELKIN, A. P.: Simpson's "Adam in Plumes": a review. *Oceania,* vol. 26, no. 1, September, 1955. pp. 77-78.

(65) GERSTNER, A.: Die glanbensmabige Einstellung der Wewak-Boikin-Leute zu den Krankheiten und deren Heilung (Nordost-Neuguinea). *Anthropos,* vol. 50, nos. 1-3, 1955. pp. 319-336.

(66) GIRARD, M. F.: L'importance sociale et religieuse des cérémonies exécutées pour les Malanggan Sculptés de Nouvelle-Irlande. *L'Anthropologie,* vol. 58, nos. 3-4, 1954*.

(67) GOODENOUGH, W. H.: The pageant of death in Nakanai. *Pennsylvania Museum Bulletin,* vol. 19, no. 1, March, 1955. pp. 19-43, illus., map.

(68) GROVES, W. C.: The blending of cultures. *In PAPUA AND NEW GUINEA SCIENTIFIC SOCIETY.* Annual Report for 1955. Port Moresby, the Society, 1955. pp. 22-33. An evaluation and restatement of the views of F. E. Williams, particularly in the education field, and its relation to present administrative policies.

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PRINCIPAL COMMISSION PUBLICATIONS

Publications issued by the South Pacific Commission include the following:—

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  Price in Australia ..... *27/6A.*

  SOCIAL ANTHROPOLOGY IN POLYNESIA: A Review of Research by Dr. Felix M. Keesing, Professor of Anthropology, Stanford University. This is a parallel study to Professor Elkin's report on anthropological research in Melanesia.
  Price in Australia ..... *27/6A.*
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  The Construction of Literacy Primers for Adults: By Dr. K. Neijs ..... *5/-Stg.*
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The above volumes are obtainable through leading booksellers.

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PACIFIC READING

No. 11

OCTOBER, 1955

This supplement is produced by the South Pacific Commission Literature Bureau; neither the Commission nor individual Administrations necessarily endorse any opinion or recommendation expressed anywhere herein. Every effort is made to check prices where quoted but they should be confirmed with suppliers before orders are placed. Inquiries concerning matters referred to herein should be addressed to the SOUTH PACIFIC COMMISSION LITERATURE BUREAU, BOX 5254, G.P.O., SYDNEY, N.S.W., AUSTRALIA.

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NOTES AND NEWS

Literature Bureau Publications. The first two titles in the 'Bonito Series'—*The Hiri* and *Across New Guinea*—have now been published by Messrs. Longmans, Green in association with the South Pacific Commission Literature Bureau. Details of these books appear in the "Book List" of this issue. It is hoped that the 'Bonito Series' will be confined to books of a factual and historical nature, with an authentic Pacific background; and we shall welcome manuscripts and suggestions for further titles in this series. Messrs. Ure Smith of Sydney are publishing, in association with this Literature Bureau, a book entitled "Wealth from the Coconut". It has been written by Mr. W. V. D. Pieris, who was technical officer on the Commission staff, and is a recognized authority on the coconut. The book deals with: selection of mother-palms; selection of seednuts; building up of nurseries; selection of seedlings; preparation of seedling holes; and the transplantation and care of transplanted seedlings; and should prove of assistance to all who cultivate the coconut palm. It has been simply written, and well illustrated with two-colour line drawings which, we believe, will prove acceptable in all parts of the Pacific. This book is regarded as being of great importance, and editions are being produced, in the first instance, in eight languages. At the time of writing this note, July, advance copies of the English and French versions have been received by the Literature Bureau. It is hoped that these editions will be published in August, 1955, and editions in Malay, Melanesian Pidgin, Fijian, Samoan, Rarotongan (Maori) and Tongan will follow later. The published price is expected to be stg.2s.6d. a copy.

Fijian Version "Debts Make Difficulties". The Fijian edition of 'Debts Make Difficulties'—entitled *Na Dinau Sa Dau Vakavuna Na Lega* has been published by the Sheldon Press, with the assistance of the South Pacific Commission Literature Bureau and the Pacific Christian Literature Society. Originally published in English in the African Home Library series, the booklet proved very popular in acquainting villagers with some of the problems of a monetary system. The Fijian version is not a straight translation, but has been adapted to make it suitable for Fijian conditions. It should prove useful as a supplementary reader in schools as well as for general adult reading. The published price of this booklet is stg.8d.

Literature Bureau Advisory Services. Increasing use is being made of the advisory services of the Literature Bureau. These services cover many of the aspects of the wide field of literature provision. The majority of the requests received by the Literature Bureau take the form of inquiries for books suitable for island readers on a variety of subjects. From the library of simply written books of general interest and relevance to the South Pacific area, which the Literature Bureau has built up since its inception, it is nearly always possible to supply information on the availability and suitability of books on a given subject. During the last year approximately a hundred requests have been received and answered; information has been supplied on approximately 1,000 titles; moreover, 784 inspection copies of books have been despatched to people in the islands in relation to specific requests. Many people in the South Pacific area experience great difficulty in obtaining books locally. Although the Literature Bureau does not sell books, it has been able to give assistance by arranging for purchases at the request and expense of inquirers. Some of the requests answered have been about the production of booklets and leaflets that are required for use in the islands. In cases where it is impossible for the Literature Bureau to arrange for the publication of these materials under its own production programme, information has been given on different methods of production, their suitability, and their comparative costs. Information has also been sent at people's request on the availability, costs, and respective merits of short-run offset equipment and modern duplicating machines designed to meet the need for the inexpensive production of small editions of booklets and leaflets.

New Health Pamphlets. The two new 8-page health pamphlets *Infant and Maternal Welfare Clinics* and *The Pregnant Woman,* referred to in these notes in the last issue of this periodical, have now been produced through the Literature Bureau in co-operation with the Health Department of Papua and New Guinea. Both pamphlets are written in simple English, attractively illustrated with line drawings, and provide essential health information in a form mainly suitable for village reading level in Melanesian areas. Single specimen copies can be obtained free of charge on application to the Literature Bureau, larger quantities can be purchased at a cost of 21s.6d. per 100 copies.

Health Reader. The Literature Bureau now has inspection copies available of a book entitled *Health and Happiness.* This is an English translation from the Malay of the book entitled *Sehat dan Berbahagia,* which was written by the Rev. I. S. Kijne and Dr. C. W. van Berkel, and was designed for use in schools in Netherlands New Guinea. Both of the authors have had considerable experience of educational work, and have designed this book for the pupils themselves. Mr. P. J. Merkelijn, of the Netherlands New Guinea Public Relations Department, has made the English translation. The publishers have generously produced, free of charge, a hundred copies of the English version in order that specimen copies may be distributed to anyone in the Pacific who is interested, to see if it would be desirable for an English edition to be published. The illustrations used in the original version have been retained for the time being; if an English edition is produced, new drawings will be executed which will make the book suited to other areas in the Pacific. Single copies of this experimental edition are available free of charge from the Literature Bureau; and we shall welcome comments and suggestions for improvements to the text, and indications of probable requirements for an English edition.

Health Leaflets and Pamphlets. The illustrated health leaflet *Tina Protects Her Family,* which was originally produced in English by the Literature Bureau in co-operation with the Health and Education Departments of Papua and New Guinea, and was designed for village reading, has now been produced in two new versions: one is in French, and has been designed for use in New Caledonia, and the other is in Malay, and is for use in Netherlands New Guinea. Both of these translated versions of the leaflet necessitated new art work which would make them suited to local conditions. The *Tina* leaflet has, indeed, proved extremely popular and more requests have been received by the Literature Bureau relating to the possibility of other versions of it. These requests confirm the opinion held in many quarters that it is often easier to meet local needs by making adaptations to existing material, instead of attempting to produce entirely new material. The Literature Bureau would be glad to assist territories requiring adapted versions of any of the existing leaflets and pamphlets which it has produced. In addition to *Tina* there are now four other leaflets entitled: *Clean Milk, Milk for Rauna, Clean Water,* and *Fruit Juice for Baby;* and two 8-page pamphlets entitled: *Infant and Maternal Welfare Clinics* and *The Pregnant Woman.* Single specimen copies of all of these are available free of charge from the Literature Bureau. New leaflets can also be produced, and the manner in which this is usually done is for the territory to supply the text with rough sketches and instructions to guide the artist. A layout and roughs are then prepared by the Literature Bureau and returned to the territory for approval; production is commenced only after the roughs are approved and returned by the territory concerned.

Experimental Booklet. The booklet entitled *Flies Are Your Enemy,* mentioned in the 'Notes and News' of Pacific Reading No. 10, has now been produced in an experimental edition, and single specimen copies are available free of charge from the Literature Bureau. There were two main reasons for producing this experimental edition. One was that it was felt desirable to demonstrate the possibilities and scope of modern low-cost printing techniques for the provision of island reading materials; and it will now be possible for those who require small editions of booklets on any subject to see what can be done. The other reason was that it is recognized that it is not easy to produce material which will meet the requirements of all concerned. This experimental edition will, therefore, serve the purpose of enabling everyone who is interested, to make criticisms and suggestions for improvement to the material before a definitive edition of the booklet is produced. The subject of the booklet is fly infested villages, and the benefits which result from ridding them of flies. It has been very simply written by the late Hon. Camilla Wedgwood, and is intended to assist in meeting the need for follow-up material for new literates which will provide, at the same time, a certain amount of useful instruction. The illustrations, which appear on each left-hand page of the book, are by Irene Maher. We shall welcome enquiries about this booklet, and we can provide, on request, details of costs of it and similar productions.

South Pacific Commission Visual Aids Productions. The following visual aids are now available from the Commission for inspection:

Colour filmstrips:

SOAP (Melanesian setting)

TOFI AND THE RHINOCEROS BEETLE (Polynesian setting)

SOIL EROSION (Fijian setting)
COCONUT SERIES:
SELECTION OF MOTHER PALMS (Polynesian setting)
SELECTION OF SEEDNUTS (Polynesian setting)
SELECTION OF SEEDLINGS (Fijian setting).

Black and white filmstrips:
MILK FOR BABIES (Melanesian setting).

Flannelgraphs:
SOAP
BOTTLE FEEDING
DENTAL HYGIENE

Posters: (Photocopies available for inspection)
SOAP (Display poster)
SOAP (Teaching poster)
TUBERCULOSIS (Display poster).

As these materials are essentially experimental, copies have been distributed to territorial administrations for comment and criticism and any alterations and amendments necessary will be made before an edition is considered final and a general distribution made.

Meanwhile anyone interested in seeing the strips in their present form should apply to the Visual Aids Officer, South Pacific Commission, Box 5254, G.P.O., Sydney.

French Films. The first of a number of films ordered from France for the Film Appraisal Library have now arrived and are available for inspection. Five titles are reviewed elsewhere in this issue of *Pacific Reading*, four sound and one silent film, all on natural history subjects. These films have been obtained through the assistance of the Centre National de Documentation Pédagogique, Paris.

Visit of Visual Aids Officer to Gilbert and Ellice Islands Colony and Nauru. The Visual Aids Officer has recently paid a visit to the Gilbert and Ellice Islands Colony. Though officially on leave, it was a working holiday and most of her time was spent in taking photographs which will be used as reference material and for use in a series of filmstrips on the Gilberts, undertaken at the request of the Administration. Discussions were also held with government personnel on audio-visual aids, and a number of requests received. The first tape of Gilbertese singing and dance music was brought back for the Clearing House Service for Pacific Broadcast Recordings.

Photographs were also taken at Nauru and discussions held with officers of the Health and Education Departments; and the Visual Aids Officer was impressed by the interest in, and eagerness to make use of, South Pacific Commission services, which were evident in this island

Advice on Filmstrip Production

BY THE PRODUCER, COLONIAL FILM UNIT

Filmstrip production is comparatively simple and straightforward and provided certain basic requirements are recognized strips of good quality can be expected.

I find that the majority of filmstrip makers have their own ideas regarding methods of working and there are no hard and fast rules to be followed as far as detail is concerned.

There are, however, a number of main stages which are common to all filmstrip making and I propose to concentrate on these and suggest what I believe would be the best arrangements to suit your requirements.

The fundamental difference between cinema films and filmstrips is that with films we rely on the visuals to tell the story and the commentary is used, or should only be used, to support the visuals. With filmstrips the opposite must apply; the visuals are used to support the spoken word. I mention this because it does affect the order of things in planning the making of filmstrips.

The first step is to produce a legend on the subject, which should be worked on and made final as far as possible. I suggest this legend or treatment should be typed with a wide margin where instructions to the technicians responsible for the photography can be added. In this connection, thumb-nail sketches are most effective in amplifying the written word.

In my view most filmstrips have far too few pictures in relation to the spoken word and invariably they suffer from a lack of good close shots. For this reason I suggest that when going through the legend to decide on the visuals required, all the main establishing scenes to be photographed should first be noted. The next stage is to go through these one by one, breaking them down into closer shots of varying camera distance, analysing each scene in relation to the script and emphasising important points by the liberal use of related close-ups, and remembering that the closer the camera the greater the emphasis.

For an average subject, such as "The day in the life of a soldier", I suggest a ratio of 40 to 50 pictures would be suitable for a talk lasting from twelve to fifteen minutes.

This may appear high by normal classroom standards, but in my experience a more frequent change of picture helps considerably in retaining the interest and attention of an adult audience, provided of course that the visuals do not stray from the spoken word and that the changes are carefully timed. I found this technique surprisingly effective with adult West Indian audiences, where the filmstrip was able to hold its own sandwiched in a programme of cinema films.

PHOTOGRAPHY

There are a few general points regarding the actual photographing of scenes with which the cameraman should be familiar and which affect the final results obtained in filmstrip projection.

Exposure. Each scene should be planned to carry relevant data and overcrowding avoided. Model lighting should be used where this is possible. Avoid areas of dark shadow, but when this is not possible use reflectors to light up detail. Establishing scenes, or long shots, should be in sharp focus all over and negatives exposed normally. In all close shots the main subject should be in sharp focus and extraneous matter out of focus.

Flash should be used for high-lighting, allowing as much light as possible from normal sources to fall on the shadow density of the negative. Alternatively, to provide good modelling, arrange for two flashes in synchronism, one at a greater distance from the subject than the other.

Processing Negatives. Work on exposure to produce normal gammas. For filmstrip work it is seldom satisfactory to attempt to correct errors in exposure by adjusting development time. Retaking the shots is the only satisfactory way.

Printing. All prints should be of a uniform size of ten inches by eight inches. Use Bromide glossy paper and except where retouching or art work is required all prints should be glazed.

It is important to obtain as near as possible evenness of photography and print density throughout the strip.

Title boards (either in English or the vernacular) should be white on black. The most satisfactory lettering is plain Gill Sans Serif.

Maps and Diagrams. Background tones are most important and should be off-white or grey with outlines clear and distinct but not overdone. The results from photographing ordinary maps or diagrams are usually disappointing. It is preferable to arrange for them to be made specially with the above points in mind.

Reproduced with acknowledgements to *Colonial Cinema.*

SOME THOUGHTS ABOUT ENGLISH BOOKS FOR THE PACIFIC

by the late CAMILLA WEDGWOOD

This article is the second part of a comprehensive examination of the language, content, and production of reading material in English for the islands peoples of the Pacific. (The first part, dealing with 'Language', was published in the last issue.)

Content

The choice of language—both of vocabulary and sentence-form—to be used in reading matter for those who are not at home in English, is intimately connected with the choice of subject matter and with the way in which this is presented.

The content of a book, both the subject matter and the ideas underlying the presentation of the subject matter, is as important as the language in determining whether or not the book will be intelligible to such readers.

When planning the content of a book it is very important to be clear about what one intends the main purpose of the book to be. It may be to teach English to children, or to adolescents or to adults; it may be to encourage people of one of these age groups to acquire the reading habit; it may be to give specific instruction in a technique, in some aspect of social studies, or in elementary science; it may be to give to people of non-European culture a better understanding of the European, and to introduce to them the ideas and the standards of value, which are a part of the European culture.

When learning to read a foreign language, the main task is to correlate the written phrase with the more familiar spoken phrase and its meaning. The subject matter should therefore be familiar, rooted in the pupil's own cultural environment. This does not mean only that the objects referred to should be familiar, but that the situations and ideas, implied or expressed in each sentence as well as in the general theme, should be familiar. For example, there is in a certain book prepared for New Guinea children a story in which two men, carrying a pig, meet a third person who buys the pig from them, giving five hens in exchange. This story contains no word which does not correspond to some object or action within the context of New Guinea cultures, but the whole situation depicted by the story is so entirely alien as to be ridiciulous or meaningless to a New Guinea reader. (Probably the interpretation he would give to it would be that it represents the way in which the European carries out the buying and selling of livestock.) Again, stories in which a Native brother and sister go about together may describe genuine kinds of New Guinea activity, such as fishing and gardening, but they do not represent New Guinea behaviour: normally brothers and sisters, after the age of seven or eight, seldom go about together—girls go with girls and women, boys go with boys and men. Some teachers may consider it desirable to break down the sex dichotomy which is a marked feature of New Guinea life from early childhood till old age, but the purpose of this book is to teach the pupil to read English, not to attempt to change deep-rooted kinship behaviour-patterns. This is true also of other types of socially accepted behaviour-patterns. We want to teach Native children to be kind to animals, but pictures or stories of children playing with a dog or a cat in a book whose purpose is to teach English to a beginner are out of place in New Guinea where these animals are not regarded as pets. A story or picture of an adult or child nursing a pig would be wholly appropriate culturally, though it might be considered undesirable for another reason: it is perhaps unsuitable that Native practices which the Administration desires to abolish should be pictured, for such representation might seem to be a sanction for them—unless, of course, they are shown only to be clearly condemned.

Content Should Also Be Interesting

It is not enough that the content of the reading material should be intelligently related to the peoples' cultural background. It should also be interesting. The very real struggle which reading a foreign language entails is made less burdensome if the learner is tempted to make the necessary sustained effort by the desire to know "what happens next". We want, also, to create in the island peoples a taste for reading, so that it will come as naturally to them as it does to us to turn to the printed word for information, to get new ideas, and for recreation. If in even the early stages of reading English, books are associated with what is interesting and not with what is tedious, then a valuable first step has been taken towards creating a Native reading public.

There are certain difficulties in the path of achieving this desired goal. When we say that reading matter for the islanders must be intelligently related to their cultural background, and also that it must be interesting to them, we must recognise that neither their cultural background nor their interests are everywhere the same. In the Pacific islands there is a great diversity of cultures: patterns of behaviour between kin, economic activities, religious beliefs and observances differ greatly, and, although many of the people (particularly the males, who today are generally more travelled than the women) recognize the existence of this diversity, each person is largely ignorant of the ways of other groups, and is contemptuous of them because they are different from his own. It is true that almost everywhere gardens and pigs are important, but the crops and the agricultural cycle are very diverse. It is true that sexual love and the desire for prestige are everywhere matters of great concern to the men, but the social conventions which regulate the attitude and behaviour of men to women and vice-versa, and the social values which determine by what paths a man may achieve distinction vary greatly from one community to another.

Even within a single community, background and interests are different according to the sex and the age of the individual. In our own society during the last fifty years sex-dichotomy has become less and less marked, but the difference between men's interests and women's interests is fully appreciated by the editors of journals and magazines and by writers and publishers of books for children and adolescents. In the islands the dichotomy between males and females is much more rigid than in our society today. Men and women may be said to lead distinct lives which touch or overlap at certain points, which are indeed complementary to each

other. The men generally profess to be contemptuous of the life of the women; the women accept their position and make no attempt to step out of their life and invade that of the men. But we must not assume that the line of demarcation between the background and interests of males and of females is everywhere the same; it often differs very significantly from the line of demarcation in our own society.

Differences in age are as important in this context as differences in sex. There is a correlation between physical age and mental development which is accepted as the norm in European countries. We are not certain whether the correlation is the same for peoples of non-European ancestry and non-European culture. We do not know for certain what is the normal age at which girls and boys attain puberty in the Oceanic islands, nor if the normal age is the same in different island groups. There is a good deal of evidence to show that in New Guinea girls reach puberty a year or more later than is usual among white Australian girls. Pending definitive evidence to the contrary, we may reasonably act upon the assumption that it is the same. But quite apart from physical age and mental age, the social age of the individual has to be taken into account. In most of the Oceanic islands, perhaps in all, social age-levels are clearly defined, and each social age-group has its approved interests, activities and responsibilities.

Until the island reading public has become much larger than it is at present, and has more money to spend upon books, it will not be practicable to produce reading matter whose content is nicely suited to males and females of all ages and all cultures. At the least, however, two categories of books are essential to satisfy the needs of those who are learning English or wish to read books in English: one consisting of books designed for young people between the ages of approximately ten and fourteen; the other consisting of books designed for adults and adolescents. It would be a great advantage if there could be a third category of books designed to meet the interests of adolescent girls and women. For some years to come the need for English books suited to the interests of children under the age of ten is not likely to be great, for in most island territories the early years of schooling are carried on in the vernacular; the number of children who begin to read English below this age is relatively small, and with the emphasis which is now laid upon teaching English orally during the first year of studying the language, this number will not probably increase very much in the near future.

Apart from the difficulties presented by a multiplicity of cultures, by the different interests of males and females, and of each at different age-levels, there is the further difficulty of discovering what are in fact the chief interests of these different groups of people, within any one culture. The European would-be author is handicapped by his ignorance of Native culture, especially of Native ideas and Native standards of value. As regards children's books, it is very necessary to recognize that, although a Native child of ten or eleven may know less (probably very much less) English than an English child of five or six who is beginning to learn to read, his range of experience within his own community is very much greater and his mental development is much more advanced. Thus topics which are suitable for early reading books for English children, such as the home and the daily doings about the house, are probably not suitable for Native children at the same level of reading ability. They may be more attracted by the kind of topics—stories of adventure full of action and high suspense—which attract our own children of the same age who have a much more advanced reading ability in English.

It is probably even more difficult to estimate what will prove interesting and attractive to adults learning to read

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FIFTH BOOK	4/6	3/9
SIXTH BOOK	4/6	4/–
SEVENTH BOOK	4/6	4/–
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BOOK THREE	3/9	3/9
BOOK FOUR	5/6	3/9
BOOK FIVE	5/9	3/9
BOOK SIX	6/3	3/9

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English. They have a more varied background, and their reasons for learning English may be so clearly defined that anything not directly related to these may be regarded as only a waste of time. Most of the adults are eager to learn about the world which is impinging upon their own and in which they are becoming increasingly involved. Straight-out instructional writing makes too heavy demands upon a person who is as yet struggling with the language and to whom, it may be, the very act of reading is a newly-acquired skill. Yet many adults learning to read English may be dissatisfied if wholly fictional material or material based wholly upon their own indigenous culture is given to them. A compromise between the allurements of a story with action in it and useful information can be achieved. Adult interest can probably be stimulated and maintained also by stories whose plot centres around the impact of European culture upon the lives of the Natives. A theme which can be successfully handled in a number of ways is that of a man who leaves his village to work for a European and of the adventures which befall him. A plot based upon such a theme, if it contains a large enough element of tension and of humour (the fool who always does the stupid thing is almost everywhere a welcome comic character) can in fact be made a very useful medium for introducing adult readers to the bi-cultural world in which, increasingly, they are being called upon to play a part. In its protean guises the Cinderella theme constantly appears in Oceanic folk-lore as it does in European, and we can assume therefore that it will be acceptable to both adult and child readers. The exaltation of the down-trodden and despised, the triumph of the good over the bad, of right over might, provide plots which may well have a special appeal to the islanders who too often feel inadequate and ineffectual before the power and wealth of their alien administrators.

If a person is to be encouraged in the arduous task of reading a foreign language, and if a habit of reading is to be created among people hitherto unaccustomed to literacy, as much attention must be given to the way in which the subject matter of a book is presented as to the subject matter itself.

Except when the reader is seeking for specific information on a subject of immediate concern to him, a story is more interesting than unadorned factual statements. Generally, too, the interest aroused is greater if the reader is able to identify himself with one of the leading characters in a story, and through that character is able to satisfy his own longings for distinction or self-expression. Thus in books for children (whether intended primarily for teaching English, for recreational reading or even for instruction), a central group of characters having the same age-range as the children for whom the books are purposed, and consisting of both boys and girls, will provide the pupils with a satisfactory centre of human interest. (A preponderance of male characters is probably desirable, for though a girl sometimes likes to think of herself as a boy, and so can happily identify herself with a boy in a story, it is so rare as to seem abnormal for a boy to build a fantasy of himself as a girl). For children's reading books, too, the plot should be concerned with a world in which children are the main factors: adults, in so far as they enter into the story, should play only subordinate rôles. Furthermore, the plot should be of a kind which expresses a child's view of his world, with clear-cut moral contrasts (the "goodies" and the "baddies") with plenty of action, tension and deeds of heroism. But the moral values so expressed must really be those of the child's own world, not those which the European author thinks should be theirs. Only where the former are in clear conflict with those generally demanded by our European culture may some compromise be necessary; on examination, however, it will usually be found that the opposition is not between different basic moral values, but arises rather from the socially-approved manner in which these are expressed, or in the social range of their operation. We deprecate the blood-feud, but the loyalty to kin, and readiness to risk death for one's kin, of which the blood-feud is in part an expression, are qualities approved by European and Native societies alike.

Presentation Of Subject Matter For Adults

What has been said about the manner of presentation of subject matter in children's books is valid also for books intended for adults. Those which are written for the purpose of introducing adults to new ideas, of widening their mental horizon, as well as those whose primary aim is propaganda, hold the attention of the unaccustomed reader more easily if they tell about adults with the same outlook as the reader, and are clothed in a story. Certain hygiene propaganda booklets issued in Spanish for the Latin American countries, show how excellently this can be done at a very simple level.

" 'And what is the use of a book,' thought Alice, 'without pictures or conversation?' "

These words probably express the opinion of most children and of a great many adults also in our own society. That it is their opinion is due partly to the fact that most people, children and adults, are more interested in people (with whom they can identify themselves, their friends and their enemies) than in things or abstract ideas. But it is due also to the fact that the language of conversation is more easy for them to read. It is not only that it is the language familar to them in speech; it is that the sentence forms are usually simpler and shorter than those of written-English, and are therefore more easily seen as a whole and comprehended. In books for non-English readers the extensive use of conversational English, which presentation in story-form makes possible, has the further advantage that it reproduces in print and so gives exercises in the language which they have learnt orally.

Those who find reading English an arduous task cannot be expected to make very long-sustained efforts at doing so. The greater the interest, the more exciting the story, the longer they will be able to concentrate, but the point at which mental exhaustion will set in will necessarily come very much sooner than it would do for those whose mother-tongue is English, and to whom reading is a familiar activity. For this reason, if the island peoples are to be attracted to the use of books, the theme must be presented in such a way that the reader does not have to concentrate for too long at a time, and that he is enticed to continue his reading from one time to another. In writings intended primarily for teaching English and for recreation, there is much to be said in favour of having a single story running through each book but divided into episodes. Each episode should be short enough to read in one or two periods of effort, and should lead on to a further episode, so that the learner will want to return to his book, lured on by the desire to find out "what happens next". This is the Scheherezade technique. All good story-tellers use it. They maintain their readers' or listeners' interest by carrying over excitement and suspense from one chapter to another until in the final chapter all is rounded to a conclusion. An outstanding example of this technique in children's fiction is the last sentence in *Dropped from the Clouds*, the first volume of Jules Verne's famous trilogy:

"It was a leaden bullet."

How came a leaden bullet to be embedded in the flesh of an animal on that desert island? Any child reading that line must long for the second volume in which to discover the answer.

The technique has been too little used in the preparation of English reading books for non-English pupils. For the most part, if the story-form is used, each book is composed of a number of distinct stories, or of a number of unrelated episodes each ending on a note of finality not of expectancy.

Perhaps one of the major difficulties to be overcome before sufficient reading material can be prepared to satisfy the

needs and wants of the island peoples, is the apparent dearth of authors skilful in the art of story-telling and willing and able to devote their skill to the production of such reading matter. Too often it is assumed that anyone can tell a story, or that anything in the way of story-telling is good enough for the purpose. Both assumptions are woefully false. There is an urgent need for creative writers who can give time to understand enough of the cultural background of the islanders to interpret their own changing world to them, and who are willing to impose upon themselves the restrictions demanded by the use of a controlled vocabulary and syntax. It may well be that in Oceania, as in Africa, the first significant step towards the production of such literature will be taken by someone belonging to the small but growing number of educated islanders.

Of recent years a number of English books have been abridged and "translated" into controlled-English in order to provide reading matter for adults and adolescents who have mastered English sufficiently to be able to understand a vocabulary of from 1,500 to 2,000 words, but for those whose English is less advanced, and whose knowledge of European ways and ideas is still very restricted there is a serious dearth of attractive reading matter. The growing libraries of such "translated" English books are intended to serve a double purpose: to provide material which will give readers opportunities for exercising and increasing their knowledge of the language; and, by introducing them to works which are part of our cultural heritage, to give them a share in that heritage and a better understanding of the European way of life. How far they do in fact achieve this double purpose, and how far they really satisfy the needs and interests of their non-English readers it is difficult to know. Some information has been published about what books are borrowed from lending libraries, and which ones are preferred by readers, but no systematic survey has been made, and what knowledge we have of the subject comes from Africa. There is some evidence that biography is preferred to other types of reading matter, but the varieties of books available to the Natives are so limited, and the data about reading habits are so exiguous, that no firm conclusions can be drawn from them.

The books which have been translated into controlled-English fall into two main categories: abbreviated translations of biographies of notable people, and abbreviated translations of English novels which are regarded as classics. The former are of real use in that they give the Native some insight into what qualities of character the English admire, and thus into the English standard of values. They have, however, two disadvantages. The central figure lives in a cultural environment alien and often almost unknown to island readers, and his real achievements (which form the core of the book) cannot be appreciated apart from that cultural environment. The second disadvantage is that the central figure is almost always a European, and unwittingly, therefore, the reading of these books may enhance the Natives' feelings of inadequacy, even of inferiority, vis-à-vis the European. This can be overcome by translating more books about the great men and women of Africa, India, China and elsewhere.

The English fiction which has been selected for translation and abridgement is less useful to island readers. Fictional writing in our own society serves two main purposes: to help people to escape from reality, and to interpret reality to them. The latter is socially the more important, and indeed whatever may be the ostensible purpose of the truly creative writer, he is in fact an interpreter of life as he experiences it. The classics of our literature hold the position which they do, not because of their bare plot, nor because of the quality of the language in which they are written, though both are important; but because the author had something significant to say to his generation which is still significant to ours.

When we consider what type of English fiction we can

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most usefully offer to Africans or Pacific islanders today, we should surely give first place to those writings in which the authors speak significantly about life in the world of today. In fact, however, this does not appear to have been done. The Natives are living in a world in which the old landmarks are rapidly disappearing. The standards of value and the patterns of behaviour which regulated social relations are no longer appropriate to the new social and economic environment. The happenings of the past fifteen years have accelerated the processes of change which had been operating ever since the coming of European administrators, missionaries and traders; and this acceleration has inevitably created in those who have been most affected by it, a sense of bewilderment and uncertainty. A fuller understanding of the European, of his customs, his ideas, his standards of values, could ease this bewilderment, and one of the media through which this fuller understanding could be given is the work of those creative writers of English fiction who are interpreting us of the mid-twentieth century to ourselves. It is, therefore, disappointing to find that the English fiction which has been selected for translation into controlled-English consists chiefly of works belonging to the very different cultural world of the nineteenth century. *Jane Eyre, The Moonstone, A Voyage to the Moon, The White Company, Rupert of Hentzau, Kidnapped,* to mention a few, how can these be said to give the Native reader a true understanding of the Europeans with whom directly or indirectly he is coming into contact? They do not even provide him with a common background of literary experience which he can share with the Europeans whom he meets, for relatively few Englishmen and Australians today are familiar with these works, though they may have "done" one or two of them at school. There are modern novels which if translated and edited might really do something to interpret the Europeans to the non-Europeans. Such books as *The Small Backroom, South Riding, Anna of the Five Towns, The Good Companions, Daylight on Saturday* are genuinely English in their setting, and the people in them are real people such as may be met with today. Some modern detective stories, too, such as those by Freeman Wills Crofts, Ngaio Marsh and Anthony Berkley would convey to the reader a genuine picture of English life and of real people (despite the melodramatic nature of their plots) and they have the advantage of being well-told and exciting tales with plenty of incident and tension. No doubt the principal reason why such modern works of fiction have not been translated into controlled-English is that permission to do so must first be obtained from the authors and if this were given royalties would have to be paid. Moreover, in most modern novels of any quality the manner of writing is as important as the plot in conveying the author's ideas. Take from *Jane Eyre* or *The Moonstone* the style in which it is written, and there yet remains a good straightforward story full of drama. This is not so in the majority of good modern novels where the central interest is not "the story". This is true also of the works of many of the best nineteenth century novelists, from Jane Austen to Meredith, though unfortunately this fact has not been appreciated in the case of Jane Austen, who has suffered at the hands of film producers and of translators into controlled-English. Long-dead authors have no legal protection against piracy and vandalism. Living authors have the right to protect their work from translation and abridgement by others, and have a right to their royalties. These rights must be jealously guarded. It may be that modern English fiction will have to be written specifically to meet the needs of the Native peoples. If this is done, however, it is unlikely that such writings will be read by any appreciable number of non-Natives; this will mean that, although such writings may give the Native insight into the ideas and ways of life of the English, they will not provide him and the Englishman with the common background which is given familiarity with the same books. This defect is not unimportant. Everyone has experienced the pleasure which comes when some casual acquaintance or newly-met stranger caps a favourite quotation or appreciates a reference to some favourite book. The sharing of experience in the world of books creates a sense of fellowship which can be of great importance in breaking down cultural and racial differences. Familiarity with stories from the Bible and with *The Pilgrim's Progress* (which may now be regarded as a world classic) has provided a large number of non-Europeans of different cultures with such a common literary background; unfortunately in English-speaking countries today these works are no longer well known as they were fifty or sixty years ago, and so cannot be said any longer to provide a common background for English and non-English speaking peoples.

In the realm of children's fiction, such as the supplementary readers provided in some series for teaching English, the choice of stories is open to the same criticism as the choice of works for adult readers: the stories do little or nothing to help the children to understand the changing world in which they will have to live as adults. Legends of Greece and Rome, stories of medieval Europe and of Elizabethan sea-farers present to the Native child a world which has little immediate relevance to the world which surrounds him. His first concern is with this world in which he has to live, and with the people of today, European and non-European who make up his social and economic environment. Apart from fiction drawn from his own Native background, the stories which he reads in English need to be concerned with the life and doings of European children of the twentieth century, with their material environment, their social values, their interests and language. Today authors of high standing are writing books for children, many of which would serve the needs of the Native children, if permission could be obtained to translate them into controlled-English and if royalties did not make the publication of such translations so expensive as to be beyond the purchase power of the Natives. The abridged and translated version of *Emil and the Detectives* is an example of what can be done in this field. Collections of Native legends and folk-tales, written in English for reading by Native children, and original stories about Native children composed by non-Native authors can be successful, but they are liable to suffer from a failure on the part of the writer to understand fully, and so in imagination truly to express, the Native cultural environment. Too often such authors have not viewed their subject from the Native angle of vision; their versions of the legends too often bear the same resemblance to the originals as Hawthorne's *Tangle Wood Tales* bears to the original Greek Legends. Perhaps stories of Native life, for both adults and children, can be wholly satisfactory only when written by Natives who have acquired a sound knowledge of English and yet have not lost touch with the life and thought of their own people. As yet no such Native authors have appeared in the West Pacific, and European writers, despite their limitations, must still be looked to to provide such English reading matter.

A Survey Of Linguistic Research

A survey of the linguistic research position in the South-Western Pacific, together with suggestions for further study, has been prepared by Dr. A. Capell and published by the very comprehensive report has numerous linguistic maps and a 70-page bibliography of publications both in and on the languages described in the text.

Each territory is surveyed in turn, a brief description being given of each language spoken, the research undertaken on it and features which merit possible further investigation. The report concludes with a statement of Dr. Capell's views on the spelling of Oceanic languages.

Dr. Capell is Reader in Oceanic Languages at the University of Sydney.

BOOK LIST No. 11

Items reviewed have been chosen for their general interest or for their relevance to educational and development problems in the South Pacific area. Wherever possible the price stated is the published price in the country of origin.

SOCIAL STUDIES

DISCOVERERS OF NEW LANDS. E. F. Dodd. London: Macmillan; stg.1s. 1953. pp.60. Illust.

Written in simplified English and with care being taken to avoid difficult sentence structures, this book has been designed as a supplementary reader for overseas secondary schools. It outlines the work and discoveries of Christopher Columbus, Vasco da Gama, Ferdinand Magellan, Captain James Cook, Captain Charles Sturt, Dr. David Livingstone, Nansen and Peary, and Scott and Shackleton. It will prove interesting reading for both children and adults.

GENERAL READING

THE HIRI. Camilla Wedgwood. ACROSS NEW GUINEA. Ivan Champion. Melbourne: Longmans, Green; A.1s. 6d. each. 1955. pp.24 each. (*Bonito Series.*) *South Pacific Commission Literature Bureau publications.*

These books are the first to be published in the "Bonito Series", which it is hoped will be confined to books of a factual and historical nature with a Pacific background. *The Hiri* is the story of the native trading expedition which was at one time made each year by the Motu people of the Port Moresby district. They used to sail to the Gulf of Papua in their lakatoi and exchange their pots for sago. The author has made a charming little story out of the subject, and descriptions of the customs and details of the voyage are accurate and interesting. *Across New Guinea* is an abridged and simplified version of Ivan Champion's well-known book, and tells the story of the way in which he and Karius made the first crossing of New Guinea from the Fly to the Sepik Rivers. Mr. E. P. W. Marriott has written this version, and his simple and direct style of writing will, we think, be appreciated by the island peoples. Both of these books have been attractively illustrated with line drawings by Miss Pamela Lindsay. The two-colour cover pages are also illustrated. We believe that these books are an excellent example of attractive production at a reasonable published price. They have been simply written and should prove useful as supplementary readers at about 4th - 6th year level of English; their subject matter is equally suited to either school or adult reading.

STORIES FROM FAMOUS POEMS. E. F. Dodd. London: Macmillan; stg.1s.3d. 1953. pp.71. Illust.

Describes briefly several stories of longer English poems including 'The Ancient Mariner', 'The History of John Gilpin', 'Hiawatha', 'The Jackdaw of Rheims', etc. It has been written for overseas students of English and is in a controlled vocabulary; suitable as a supplementary reader for secondary schools.

SCIENCE

SCIENCE IN THE MODERN WORLD SERIES. W. E. Flood. London: Longmans Green & Co.; stg.3s. each. 1948-51. pp.138-144. Illust.

The first book in this series *The Earth Around Us* was reviewed in the booklist of *Pacific Reading No. 8*, September, 1954. Other titles include: *The Air Around Us, Machines and Engines, Wonders of Light, Electricity and its Uses, Fire and Heat, Treasures from the Earth* and *Materials and their Properties.* Like the first volume these books are intended to act as an introduction to scientific methods and principles for overseas students and explain the role of some aspect of science in everyday life.

The Air Around Us—deals with wind, rain, and weather; breathing, burning; gases, pumps; balloons and aeroplanes. *Machines and Engines*, after describing simple mechanical contrivances such as levers, pulleys, and screws, natural sources of power, then details the working of such things as windmills, water turbines, steam and petrol engines and finally touches on electric and atomic power. *Wonders of Light* starts with simple ideas before proceeding to deal with lamps, shadows and straight line propagation. Later chapters discuss mirrors, lenses and optical instruments, colour, x-rays, and photo-electric cells. *Electricity and Its Uses* discusses the essential principles of electric cells and circuits, electric lighting and heating, electroplating and electro magnets. Other chapters deal with generators, power distribution, electric motors, the telegraph and the telephone. *Fire and Heat* starts with a discussion of the nature of combustion, fire and flame and the commonest types of fuel. The methods of transmission of heat are examined as well as man's use of fire as a source of heat and power. *Treasures from the Earth* tells the story of man's use of rocks and the process of making useful materials from them. Topics discussed include build-

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Food and the Work it Does

LUCY HAMILTON

This book by the Dietitian, Department of Public Health, New Guinea, is published in co-operation with the South Pacific Commission Literature Bureau. Illustrated.

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ing materials, coal, oil, the commoner metals, jewels, and finally the sea as a source of materials. *Materials and Their Properties* gives an account of the various properties of matter and the uses which are made of different materials because of their special properties. The three states of matter are described and porosity, strength, rigidity, flexibility, elasticity and the surface tension of liquids are examined. A final chapter describes some new materials which man has made.

This is a well-planned series, clearly printed and illustrated by numerous photographs, drawings and diagrams. There are many suggestions for simple experiments which may be carried out with a minimum of apparatus. The books should be particularly useful for secondary school reading, libraries, and for adults who want to know more of the "mysteries" of science.

FUN WITH SCIENCE. Mae and Ira Freeman. New York: Random House; $1.50. 1943. pp.60. Illust.

This clearly printed, well-illustrated book has been designed for young American children to give them some knowledge of the basic facts of science Each basic fact is first explained in simple language, and then follow little experiments demonstrating the principle which has been explained. These experiments require only the absolute minimum of equipment and all that is essential are a few things such as candles, milk bottles, rulers, tumblers, rubber bands, etc. The experiments are clearly illustrated by large photographs and are very simple to follow. A delightful and useful book; but perhaps rather a luxury except for the larger central libraries and schools.

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HEALTH

HOW TO TEACH HYGIENE, HOME NURSING AND FIRST AID. Esther Koeune. Nairobi; Eagle Press. E.A.2s. 1950. pp.64.

This book was designed to assist African teachers in primary schools to prepare their lessons; and to supplement their practical experience by giving them more theoretical knowledge. The author has described in simple terms many of the ailments from which the Africans suffer. Much useful information has been included on the prevention of disease, on home remedies, and on diets for the sick person. It is emphasized in the book that, although it is necessary and desirable for the teacher to have a knowledge of first aid treatments, and that he should pass on this knowledge to his pupils, first aid is only a means of preserving life until the patient can be attended by a doctor. The book has been inexpensively produced and profusely illustrated with drawings of germs and insects, and with amusing match stick drawings indicating the ways in which diseases are spread. Of course, much of this book applies only to African conditions, but most of its contents might be found useful by the native teacher in primary schools in the Pacific islands.

COMMERCE

BUSINESS EFFICIENCY FOR EVERYBODY. K. E. L. Hooper. London: Longmans, Green; stg.1s.8d. 1948. pp.61. (*Pathfinder Books*)

This book has been designed primarily for Africans who are either in business or who wish to enter business. It lays a very good foundation of first principles of business, and discusses a few of the finer points. The rule which it gives for success is: 'Work hard, be methodical, be shrewd and be honest'. The book has chapters on 'What is Efficiency?'; 'Some First Principles' (which has paragraphs on honesty, courtesy, service to the public, reliability, cleanliness, punctuality, and planning); 'How to Start a Business'; 'Drawing up Your Budget'; 'Correct Buying'; 'Correspondence'; and 'Banking'. There is little doubt that this book will probably be helpful to the island trader or for those in the islands who wish to enter business on their own account. It is written in a simple manner and is direct and outspoken.

ARTS AND CRAFTS

THE TECHNIQUE OF HANDICRAFT TEACHING. S. L. Glenister. London: G. Harrap & Co.; stg.7s.6d. 1953. pp.157.

This book is primarily a manual for handicraft teachers. The author has drawn on his own wide and varied experiences over a period of years in this field of teaching and discusses the pros and cons of all aspects of handicraft teaching in a lively and stimulating manner. He points out: "If the handicraft teacher, in common with the teacher of other subjects is to be successful, he must build his work on a sound foundation of philosophical principles to motivate and guide him, he must be convinced of the educational value of his work and he must go farther and translate these conditions into practical aims". Just how the teacher can do this is discussed in this book. The topics covered include—the commercial side of handicraft teaching, giving and preparing lessons, class control and supervision, schemes of work, visual aids and educational visits, room organization and care of equipment, and the handling of backward classes

Handicraft teachers in the islands will find this well-written book a wealth of information, with many of the points discussed very akin to their own problems.

MATERIALS. K. M. Trowell. London: Longmans, Green; stg.1s.9d. 1951. pp.40. Illust. (Art Teaching in African Schools)

In many schools no attempt is made to teach art because there are no materials or equipment and no money to buy them. The author of this book is well acquainted with this problem and she gives much useful information that will help to solve the problem of costly equipment and materials. She describes briefly the manner in which blackboards, easels,

pens, brushes, charcoal pencils, and palettes can be made, using easily-obtainable and inexpensive materials, many of which will be found locally. Paper and inks may be expensive, but for the enterprising and enthusiastic teacher with limited funds this is not an insurmountable barrier; many colours can be made from different coloured earths and soft rocks, or from plants, and an explanation of how to obtain some of these is given; as a last resort even newspaper can be used if there is no other paper available. The final chapter of the book gives many useful and helpful suggestions to the teacher on the organization of the class and criticism of the pupils' work. This book, like others in the series, is a very useful guide to the native art teacher and others will find that they can probably learn from it. Other titles in the series are *Design*, *Picture Making*, and *Basketwork*.

SPORT AND PHYSICAL TRAINING

THE MANUAL OF RUGBY UNION FOOTBALL. Edited by H. F. Ellis. London: Educational Productions Ltd.; stg.7s.6d. 1953. pp.280.

In recent months we have had several enquiries from the islands about books dealing with football. This one, dealing with Rugby Union, is an official manual, and should be useful to both the player interested in improving his game and the coach who wants to get the best out of his team.

The first section of the book is mainly directed to players and covers the technique and tactics of the game from its most elementary beginnings. Chapters deal fully with all aspects of passing, tackling, forward play, play of the halves, three-quarters and full-back, both individually and as a unit. Team tactics and notes on captaincy are given in the final chapter of this section. Part 2 is for those coaching teams, and describes in detail just how to pass on the information given in Part 1.

The text is well illustrated by numerous photographs and diagrams—in fact, there are sixteen pages of photographs, over thirty black-and-white drawings and a sixteen-page section of coloured diagrams illustrating tactical moves.

PHYSICAL TRAINING FOR WEST AFRICA. N. C. Kay. London: Macmillans; stg.7s. 1953. pp.163. Illust.

This comprehensive book on Physical Training has been written by the Education Officer in charge of the Government Teacher Training Centre at Uyo, Nigeria. It should be found useful by teachers and educationists in the Pacific. It describes almost every aspect of the subject including: the purpose and value of physical training; the organization and teaching of lessons; grouping classes according to age and size; exercises to develop mental alertness; common faults fundamental positions and exercises; how to build up a physical training table. Eighteen tables at the end of the book could be used to cover three years' work at the rate of six tables a year and are designed for use in senior primary schools, secondary schools, and teacher training institutions, and are suited for use of boys over thirteen years of age. The exercises have in many cases been illustrated by photographs, and, although the reproduction of these is not first-class, they are sufficiently clear to make the point which they demonstrate easily understood. Diagrams have been used to indicate the position of the class for exercises and for team games. The book covers nearly every aspect of physical training for boys and girls throughout their school years.

REFERENCE BOOKS

THE WORLD'S GREATEST WONDERS. Haddon, R., and others. London: Odhams Press A.22s.6d. No date. pp.320. Illust.

This book is devoted almost entirely to photographs, with brief explanatory notes appearing under them. The high cost of illustrations makes it quite impossible for a book of this size and price to be a really first-class production; but, everything considered, this is a book of exceptionally good value. It is divided into sections under continents of the world and in each of these sections there is a brief introduction giving facts and statistical details; then follow photographs illustrating the wonders of nature and man's architectural triumphs. The captions to the pictures are instructive and often pithy and amusing. The pictures range from Great Buddhas to great bridges; from the grace and beauty of Chartres to the grotesque bodies of mummified Spaniards in the catacombs of Santa Fé De Guanajuanto in Mexico; from one contrast to another, and with something to please, instruct, and interest almost everyone. This book is a fascinating conglomeration of interesting facts and figures and it will make a welcome addition to the reference books in school libraries everywhere.

PERIODICALS

EVERYWHERE. Sydney: Pacific Christian Literature Society. A.2s.0d. pp.22.

The first issue of this periodical was published experimentally in July. It has been designed to provide a popular paper containing items of interest to islands peoples everywhere in the Pacific. This is one of the first attempts to meet the apparent need, on a regional basis, for a magazine produced for islanders. We understand that the continuation of publication will to a large extent depend on the support received for this experimental edition; and we feel sure that all who are interested in the provision of reading material for islands peoples will wish to obtain copies. Some of its articles are mainly of interest to followers of the churches, but some are of general interest, and these include: 'What Makes It Rain', 'The Story of Coral', 'The Central Medical School, Suva', and 'The Breadfruit Tree'. It has been attractively produced, printed on good quality paper, and there are numerous illustrations.

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VISUAL AIDS

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*ASSASSINS DE L'EAU DOUCE. 16 mm. 20 min. Black and white. Sound. Jean Painlévé. Price approx. £A.35.

This film was awarded a prize as an outstanding school film and there is no doubt that it is a remarkable piece of work. Not only does it have the essential qualities of clarity and simplicity, but it has a great deal of artistry and imagination, and is full of brilliant little sequences. The creatures that live in freshwater ponds are the actors and the film shows that below the surface of the most serene and idyllic of these pools there is continual drama, violence and warfare. There are quite astonishing close-ups of underwater battles for life, of death agonies, and of insects catching and devouring their victims. There are brilliant flashes of minute jaws chewing, strange insect eyes and faces, fantastic movements, graceful or humourous, and one extraordinary sequence showing a tiny creature destroying its victim by slowly breaking its back. But having shown us that a placid pond may conceal an underwater jungle, full of murderous inhabitants, the film closes with the word FAIM (HUNGER), the reason and explanation of this bitter, endless warfare. Excellent photography, French titles, and background music.

*CRABES ET CREVETTES. 16 mm. 10 min. Black and white. Sound. Gaumont British Franco Film. Price approx. £A12 10 -.

Jean Painlévé, who made this film and others devoted to marine biology, reviewed here, is not only a good film maker but has a great deal of imagination, humour and understanding of his subject. These gifts have enabled him to produce films that are full of life, information and interest. In this one he shows clearly how crabs and shrimps are constructed, the difference between sea and land types and how they live and get their food, using for instruction such lively and amusing shots as a crab carrying an anemone on its back, shrimps pouncing through the water like little sea horses, and close-ups of surly crab faces and fatuous shrimp faces. The film has no spoken commentary; there is a musical background and titles in French.

*LA FAUNE SOUS MARIN. 16 mm. 10 min. Black and white. Sound. Gaumont British Franco Film. Price approx. £A.12.

Crabs are the subject of this film and pains have been taken to show as much as possible of their structure and habits. They are seen walking, catching food, eating, fighting and courting. Some of the sequences which dwell on the great claw or on two villainous crabs boxing have a sinister character, and there are curious scenes that show how the creature renews the water it takes in by a constant movement of the mouth; how its eyes can move in and out, and how it runs and climbs. The sound track is composed of music, and there are titles, in French, throughout the film.

*LE LEZARD. 16 mm. 10 min. Black and white. Silent. Les Films du Compas. Price £A.26/10/-.

There is a brief introduction showing the crocodile, tortoise, and snake before the film concentrates upon its main subject, the lizard. We are shown its structure, its limbs and how they are placed on the body, and slow motion and close-ups demonstrate the way in which the legs and eyelids function. There is a reference to the nature of the skin and its markings, a good animated diagram showing the circulation system, and a sequence on the emergence of a baby lizard from its egg. After mentioning that lizards are hibernating creatures, the film ends with the reminder that they are harmless animals that help us by destroying insect pests, and deserve our protection.

*MEN WHO FISH. 16 mm. 20 min. Black and white. Sound. United States Army. Price £A.33.

This documentary film was made in a fishing village in Japan. Very skilfully, and with great understanding, the daily life of a Japanese fisherman is shown, and the poetic treatment builds up a strong feeling of sympathy for the fishermen and in particular for the main character, Masawa, whose ambition it is to give his boy a good education. The film outlines the way in which the new laws governing fishing rights, and the establishment of local Co-operatives, are helping the Japanese fishermen to-day. The whole production is outstanding, notably the photography and the imaginative way in which local work songs have been used as background music. The details showing fishing methods in Japan should be of interest to fishermen anywhere.

*NEW LANDS FOR OLD. 16 mm. 10 min. Black and white. Sound. Documentary Films of India. Price £A.10.

This film demonstrates in a graphic fashion some of the causes of soil erosion. It draws its examples from the Demoda Valley in India and goes on to show how the Demoda Valley Corporation, formed in 1943, dealt with the problem. The ground was contour-ploughed and terraced, leguminous crops were ploughed in to replace nitrogen in the soil, grasses planted, fish breeding ponds established, and reafforestation schemes begun. Most important of all, the film shows how all these improvements affected the lives of the people. Villages were shifted and rebuilt, and model settlements established. The film is carried along by an infectious enthusiasm which should be most useful in stimulating an interest in control of soil erosion.

*THE PAINTED MEN. 16 mm. 15 min. Black and white. Sound. Produced by James Jeffrey, Port Moresby. Price £stg.50.

This is the first story film made in Papua, New Guinea, using an all native cast. It was made primarily for the entertainment of natives of that territory, but there is no doubt that this unpretentious adventure story would entertain island people anywhere. The plot is a simple one. A girl is kidnapped from her village by a band of bush natives and is rescued by the hero, who thereby wins her father's approval. Despite the difficulties which apparently beset the maker (trying to find suitable cast and keeping them interested in the job), the story proceeds at a good pace and the interest is held throughout. The editing is good and the photography of a high standard.

*SOUTH PACIFIC ISLAND CHILDREN: Life in Fiji. 16 mm. 10 min. Colour. Encyclopaedia Britannica Films Inc. Price approx. £A.40.

This is a simply told tale of village life in Fiji to-day, using the activities of one family to show how Fijians build houses, tend gardens, go to school, fish, feast and enjoy themselves. Fijian songs are used as background music with good effect. The photography and editing are good, although the crosscutting from house-building scenes to women working in the gardens or children at school may be confusing to an audience unused to editing techniques. The general technical standard is good.

*TANDJONG KERANG. 16 mm. 10 min. Black and white. Sound. Malayan Film Unit. Price £A.7/10/-.

This documentary on Rice tells how the Tandjong Kerang Irrigation Scheme has been instrumental in providing a new Granary of Malaya. The scheme was in operation from 1933 to 1936 and was started again in 1945, when the draining of the swamps and the digging of irrigation channels and main canals made the area safe from floods. Homes were built and rice production begun. Through irrigation the water was controlled and directed to where it was most needed, with the result that useless land began to yield a bountiful harvest of rice. The film clearly demonstrates the worth of long years of hard work, when the result is the achievement of more land for food production in a food-starved country. The technical standard of the film is good.

*LES VOLCANS. 16 mm. 20 min. Black and white. Sound. Atlantic Films. Price approx. £A.25.

This film may be considered a little advanced, but it is an interesting subject and the treatment is reasonably general. There are clever diagrams which show how volcanoes occur, and shots of actual eruptions are used to explain the different types. One feature which would perhaps be unsuitable for the Pacific is a sequence in which a model of Paris is used to show the relative depths of debris built up after different eruptions, and which would be rather meaningless to island peoples. On the other hand, the film has plenty of interest and scenes of eruptions and their consequences in different parts of the world are very graphic. Maps are used to show the distribution of volcanoes and the film has a spoken commentary, which is in French.

Filmstrips

LES BONNES HABITUDES. Produced by the Centre Audio-Visuel d'Haiti, Department de l'Education Nationale. Black and white. 36 frames. No captions. Typed commentary in French. Published price A.36s.

Subject: How to be healthy.
Medium: Drawings.
Technical Standard: Below average.
Comment: Drawn in Indian ink on virgin film, the pictures in this strip tell us the story of two neighbours, Joseph and Mercidieu. Joseph is healthy and strong and works hard in the coffee plantation, but Mercidieu is weak and ill, has fearful toothache and is over-run with lice, among other things. Joseph, finding him in bed, gives him some good advice about cleanliness, rest, diet and dental care, and the strip ends with the two neighbours posed beside a legend reading "Vive les bonnes habitudes". The drawings, though extremely crude, are extraordinarily graphic at times, and always entertaining. General.

*CAPTAIN COOK. Lives of Famous Men Series. Produced by Common Ground Ltd., London. Black and white. 47 frames. Teaching notes. Published price Stg.16s. 6d.

Subject: Captain Cook's life and achievements.
Medium: Photographs, maps, drawings.
Technical Standard: Good.
Comment: Contemporary drawings have been used to provide an imaginative treatment of Captain Cook's life. The filmstrip, supplemented by excellent notes, emphasises the importance of Cook's contribution to charting and navigation before he made his three voyages to the Pacific. The skilful presentation of the places visited by Cook on these voyages and his adventures there should awake a lively interest in his life story. . . . . Ages 11 +

*COCONUT GROWING IN FIJI. Produced by the Tasmanian Education Department. Photographs by Public Relations Office, Fiji, supplied through South Pacific Commission. Black and white. 22 frames. Captions. No teaching notes. Published price: apply.

Subject: Coconut Growing in Fiji.
Medium: Photographs and drawings.
Technical Standard: Good.
Comment: The strip begins with a drawing of a cross-section of a coconut and the products derived from its various parts. Then it proceeds to outline how the coconut is grown, the methods of copra production in Fiji and the preparation of coconut oil. The photographs are particularly well chosen to illustrate a single point clearly and concisely. . . . . General.

FLY CONTROL. Jet Series. Produced by the Christian Medical Association, India. Black and white. 15 frames. No captions. Printed commentary. Published price A.16s. 9d.

Subject: How to fight the fly menace.
Medium: Drawings.
Technical Standard: Average.
Comment: Another one of the series in which very lively little stick figures illustrate a health lesson—in this case, how to deal with flies. The gloomy sequence of filth, flies, flies on food, illness and death takes up the first half of the strip, and the other frames show ways of protecting food and helping wipe out flies. Cards for classroom use are provided. . . . . General.

*IT PAYS TO CO-OPERATE. Produced by the Central Office of Information, London. Black and white. 33 frames. No captions or subtitles. Teaching notes. Published price Stg.5s.

Subject: Examples of co-operation in the Colonies of the British Commonwealth.
Medium: Photographs.
Technical Standard: Very good.
Comment: Each frame of this strip provides a starting point for discussion about a basic principle of co-operation. The strip has the added advantage of taking its examples from a number of different British dependent Territories. It demonstrates that it "Pays to Co-Operate" by outlining the success of co-operation in a number of different fields, such as Production, Marketing, Thrift and Credit societies, and Better Living societies. The illustrations make clear some of the advantages to be gained by Co-operation and give a comprehensive picture of the size and the strength of the movement. There are 740,000 members of Co-operatives of all kinds in 26 Territories. . . . . General.

MALARIA: LE PALUDISME. Produced by the World Health Organisation, Geneva. Black and white. 51 frames. No captions. Teaching notes. Published price Stg.12s. 6d.

Subject: Malaria and its control.
Medium: Photographs, drawings and maps.
Technical Standard: Average.
Comment: Map shows the extensive distribution of malaria in the tropical and subtropical regions of the world. Drawings illustrate the life-cycle of the malaria parasite, the role played by the Anopheles mosquito in transmitting the infection from man to man, and that in the absence of this mosquito there can be no malaria. The global role of the World Health Organisation in the control of malaria is shown. The latter part of the strip portrays the successful campaign sponsored by the World Health Organisation for the control of malaria in North Thailand and the benefits derived therefrom.

*PEOPLES OF AFRICA. Peoples of Other Lands Series. Produced by Common Ground Ltd., London. Black and white. 38 frames. Subtitles. Teaching notes. Published price Stg.16s. 6d.

Subject: Peoples of the desert, forests and grasslands of Africa.
Medium: Photographs and maps.
Technical Standard: Good.
Comment: An attempt has been made to illustrate and describe typical life in each of the three main regions in Africa, and the way in which geographical factors govern the pattern of existence. As far as possible the effects of European colonization have been omitted in an endeavour to illustrate native life in relation to natural environment. The desert, forest and grassland regions are represented by the peoples of the Sahara, pygmies of the Congo, and the Basutos. The photographs are well chosen and the additional material for older children, provided in the notes, is valuable. . . General.

PORTEZ DES SANDALES. Produced by the Centre Audio-Visuel d'Haiti, Department de l'Education Nationale. Black and white. 26 frames. No captions. Typed in French. Published price A.36s.

Subject: Necessity to wear sandals.
Medium: Drawings.
Technical Standard: Below average.
Comment: Merilia goes to market in her bare feet. She cuts her foot on the way, does not stop to wash it, and gives it no rest or attention. Before long she has a poisoned foot, has to go to hospital and is unable to do her work; all because of carelessness and ignorance. Moral: wear sandals. Line drawings on virgin film tell this simple tale with directness and animation. . . General.

YOUR TEETH. Produced by Basic Films Ltd., London. Colour. 24 frames. Subtitles. Teaching notes. Published price Stg.15s. 6d.

Subject: Structure and care of the teeth.
Medium: Drawings, diagrams.
Technical Standard: Very good.
Comment: In four sections, this colour filmstrip shows the growth and formation of the teeth in children and adults; the structure of the teeth; disease and decay; and care of the teeth. Each section is clear and well-illustrated and there are some good diagrams of the right way to clean the teeth. There is no section on correct diet and only a very brief reference to it in the notes, and to be fully effective the filmstrip would need to be supplemented by a lesson on this important part of dental health education. 11-15 ages.

The following three filmstrips produced for the Army Kinema Corporation by the Publicity Picture Productions Ltd., London, deal with certain aspects of malaria control. These filmstrips would be useful as teaching aids for training malaria control personnel.

(i)

*PRINCIPLES OF MALARIA CONTROL. Part I. Entomology of the Mosquito. F.S.105. Black and white. 33 frames. Subtitles and captions. No teaching notes. Published price Stg.8s. 0d.

Subject: Morphology and life cycle of the mosquito.
Medium: Drawings and diagrams.
Technical Standard: Average.
Comment: By simple diagrams, this filmstrip illustrates the

morphology of the mosquito, its life-cycle and its habits. The characters by which the two main tribes of mosquitoes can be differentiated, and the important diseases carried by them are mentioned. Some of the habits of the Anopheles mosquito, the carrier of malaria, are described.

(ii)

*PRINCIPLES OF MALARIA CONTROL. Part II. The Malaria Parasite. F.S.106. Black and white. 33 frames. Subtitles and captions. No teaching notes. Published price Stg. 8s. 0d.

Subject: Life-cycle of the malaria parasite.
Medium: Drawings and diagrams.
Technical Standard: Excellent.
Comment: This filmstrip illustrates diagrammatically the life-cycle of the three species of malaria parasites, and their development within the body of the Anopheles mosquito. The latter part of the strip furnishes the technique of dissecting mosquitoes and examination for the presence of malaria parasites in the mosquito.

(iii)

*ANOPHELES VECTORS OF MALARIA. F.S.111. Part I. The Mediterranean Area. Black and white. 40 frames. Subtitles and captions. No teaching notes. Published price Stg.8s. 0d.

Subject: Malaria vectors in the Mediterranean area.
Medium: Maps, diagrams and drawings.
Technical Standard: Excellent.
Comment: "Effective mosquito control in a malaria area depends on a working knowledge of the habits and breeding places of the anopheline vectors." The aim of this filmstrip is to teach how to recognise the species of Anopheles that carry malaria in the Mediterranean area. For each of the five species of importance in the transmission of malaria in this area, diagrams and drawings illustrate the distinguishing characters of the adult and the larva, and the places where they breed and where they rest; maps show the range of their geographical distribution in the area.

Visual Aids In Fundamental Education

THOSE concerned with development in the Pacific area will be interested to learn that the Commission has just received on loan from Unesco a travelling library of visual aids for fundamental education. It consists of a collection of films, filmstrips, posters and photographs on various aspects of fundamental education, and a selection of books on the use of visual aids.

The Commission will act as distributing agent for the library in the Pacific. Because of the special transport problems of the area and the number of territories, Unesco has agreed to extend considerably the usual loan period of six weeks. This should enable interested authorities in the main Pacific territories to view the library, which provides a unique opportunity of examining a wide variety of visual aids not otherwise available to them.

The aim of the travelling libraries, only seven of which have so far been prepared, is to indicate to those working in the field of community development the range of existing visual aids and the way in which they can be used with unsophisticated audiences. The idea was originally put forward by the Unesco Seminar on Visual Aids in Fundamental Education, held at Messina in 1953.

The items in the library have been selected to include productions from as many areas as possible, covering the main subjects of fundamental education and providing examples of various production techniques and media. Not all of the items will of course be suitable for use in the Pacific, but many of those which deal with universal problems of underdeveloped areas, such as illiteracy and disease, could be successfully adapted. In any case, the library is in the nature of an experiment, and Unesco requests that fundamental education centres using it will submit a critical report on its value as a source of information.

Much thought has been given to the arrangement of the library, so that individual items can be located and displayed as easily as possible. The material is packed in four wooden cases, each in a metal container, the total weight being about 600 pounds. The first case contains all the books and articles on visual aids techniques, the second and third, films and filmstrips, and the fourth, posters. A manual gives instructions for the use of the library, suggested programmes and an individual description of each item. The cases are conveniently divided into drawers and compartments, each item being numbered accordingly, and the fourth case can be opened to form an easel for examining the posters it contains.

The whole unit, which is fully insured by Unesco, is being made available to the territories requesting it free of charge, although it is expected that they will meet the expense of sending it to the next centre requiring it.

No elaborate equipment is necessary for using the library. Main essentials are a suitable room for projection, a 16 mm. sound projector, and a filmstrip projector for single and double-frame strips. It is recommended that programmes should be conducted by a visual aids specialist, assisted by a professional projectionist and someone to read the filmstrip commentaries.

Each of the nine suggested programmes into which the manual divides the material lasts 2½ to 3 hours, including discussion time. The best method of presentation would probably be in three to five-day seminars, to be attended by officers concerned with fundamental education. However, different programmes and methods of use can easily be devised to suit the particular needs and interests of any territory. The full description of all the items in the manual enable users to plan their own programmes, if desired, without first having to examine the material in detail. Evaluations and producers' notes are also given for many of the items.

The suggested programmes are based on different aspects of fundamental education, such as literacy, control of disease, and improved farming methods, and each one includes films, filmstrips and other visual aids related to the main theme. The ninth programme is intended to demonstrate visual aids techniques, particularly those which require only simple, locally-available equipment. The material for this programme includes a model of a silk screen frame for poster production and a sample flannelgraph, as well as the usual films, filmstrips and posters.

A more detailed description of one of the programmes will indicate the wide variety of material they include. Programme VIII on Diseases consists of five films (from U.S.A., the French Cameroons and Nigeria) entitled "Enemy of Your Eyes", "Hookworm", "La Lèpre", "*Malarie du Sommeil*" and "Smallpox"; two filmstrips (from China and India) entitled "Pulmonary Tuberculosis" and "Itch"; and a poster on Yaws from Haiti. Most of the other programmes contain a larger number of items, but grouped in a similar way. The manual also gives the running time of the films, the length of the filmstrips and the location of each item in the cases.

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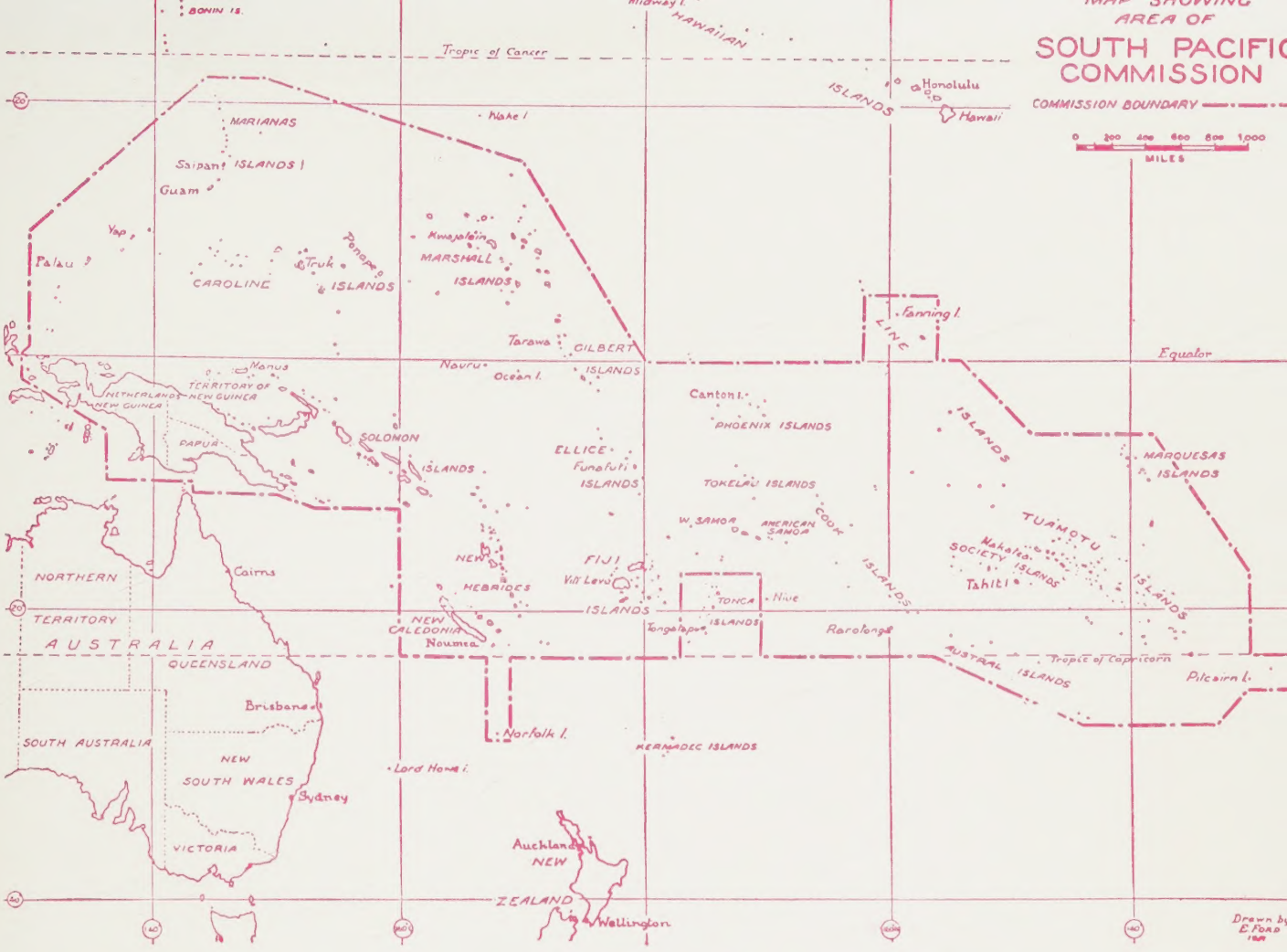

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76. **A Bibliography of Tropical Housing.** January, 1955. 42 pp.
77. **A List of Diseases and Parasites of Animals Recorded in the South Pacific Territories.** Bilingual. December, 1954. 60 pp.
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79. **A List of Insect Pests Recorded in South Pacific Territories.** Bilingual. August, 1955. 204 pp. (6/- stg.)
80. **Malaria Control and Research in Netherlands New Guinea.** By Dr. R. H. Black. March, 1955. 24 pp., map.
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3. The Village Library. April, 1950. 9 pp., book list.
4. Visual Aids in Education in the South Pacific. By A. L. Moore, Visual Aids Consultant. April, 1950. 58 pp.
5. Fisheries and Animal Health Research Projects of Significance for the South Pacific Region, conducted under the authority of the C.S.I.R.O., Australia. May, 1950. 9 pp.
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7. A Preliminary List of Plants Introduced into Tahiti. July, 1950, 21 pp.
8. Insect Pests in the Wallis Islands and Futuna. From report by F. Cohic, Entomologist, Institut Francais d'Oceanie. Dec., 1950. 30 pp.
9. Report of Plant and Animal Quarantine Conference, Suva April, 1951. 24 pp., two annexures.
10. Bibliography of Co-operation in the South Pacific. April, 1951. 10 pp. (Out of print. See Technical Paper No. 51.)
11. Interim Reports on the Moturiki (Fiji) Community Development Project. By Howard Hayden, Director of Education, Fiji. May, 1951. 48 pp.
12. Tuberculosis Investigations by the South Pacific Commission in 1950. May, 1951. 124 pp.
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14. Educational Broadcasts to Samoan Village Schools. Department of Education, Western Samoa. May, 1951. 7 pp.
15. Libraries for Beginners. By Dr. & Mrs. Kenneth Iodd, Kwato Mission, Eastern Papua. July, 1951. 21 pp.
16. Some Notes and Suggestions Regarding Conservation of Important Archaeological Sites and Archives in South Pacific Territories. By F. M. Keesing. August, 1951. 19 pp., bibl. (5/- stg.)
17. Conference of Experts on Filariasis and Elephantiasis, Tahiti: Summary of Proceedings. September, 1951. 22 pp.
18. Report on Nutrition Investigations by the South Pacific Commission in 1950 November, 1951. 77 pp., tables, graphs.
19. Report on Copra Grading. November, 1951. 20 pp.
20. Research Workers in the South Pacific. December, 1951. 15 pp. (Out of print. See Technical Paper No. 52.)
21. Note on the Mycoflora of Rice Seed in the Territories of the South Pacific. By Dr. F. Bugnicourt, Director, Institut Francais d'Oceanie. January, 1952. 5 pp., appendices, bibliography.
22. Chemical Composition of the Milk of New Hebridean Mothers. By F. E. Peters, biochemist, South Pacific Commission. Feb., 1952. 7 pp.
23. Nutrition Research Conducted in New Hebrides during 1951. By Sheila Malcolmn, nutritionist, South Pacific Commission. April, 1952. 51 pp., tables, graphs.
24. A Survey of Leprosy on the Island of Nauru. By Dr. C. J. Austin, Director, Makogai Leprosy Hospital, Fiji. April, 1952. 8 pp., illus.
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41. Social Problems of Non-Maori Polynesians in New Zealand. By Rev. R. L. Challis, Pastor of the Pacific Islanders' Congregational Church in New Zealand. Feb., 1953. 15 pp., bibliography.
42. The Co-operative Movement in Papua and New Guinea. Prepared by the Registry of Co-operative Societies, Port Moresby. February, 1953. 28 pp., sample Co-operative Society Records.
43. Research in Queensland in Tropical Plant and Animal Industries. By Jacques Barrau, Technical Officer, South Pacific Commission. May, 1953. 70 pp., illus., maps, appendices.
44. The Use of the Vernacular in Teaching in the South Pacific. By G. J. Platten. June, 1953. 34 pp., appendices.
45. The Nimboran Community Development Project. By Dr. J. van Baal, Director of the Bureau of Native Affairs, Netherlands New Guinea. June, 1953. 42 pp., map, chart, appendices.
46. The Koror Community Centre. Reports supplied by the High Commissioner, Trust Territory of the Pacific Islands. August, 1953. 34 pp., illus.
47. Central Vocational Training Institution. By F. J. Harlow. Aug., 1953. 82 pp. (5/- stg.; plans available sep., 5/- stg.)
48. The Management of Coconut Plantations in Western Samoa. By D. R. A. Eden. September, 1953. 32 pp., illus., diagram.
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